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Commodore MAGAZINE

18 Software Reviews

RUN

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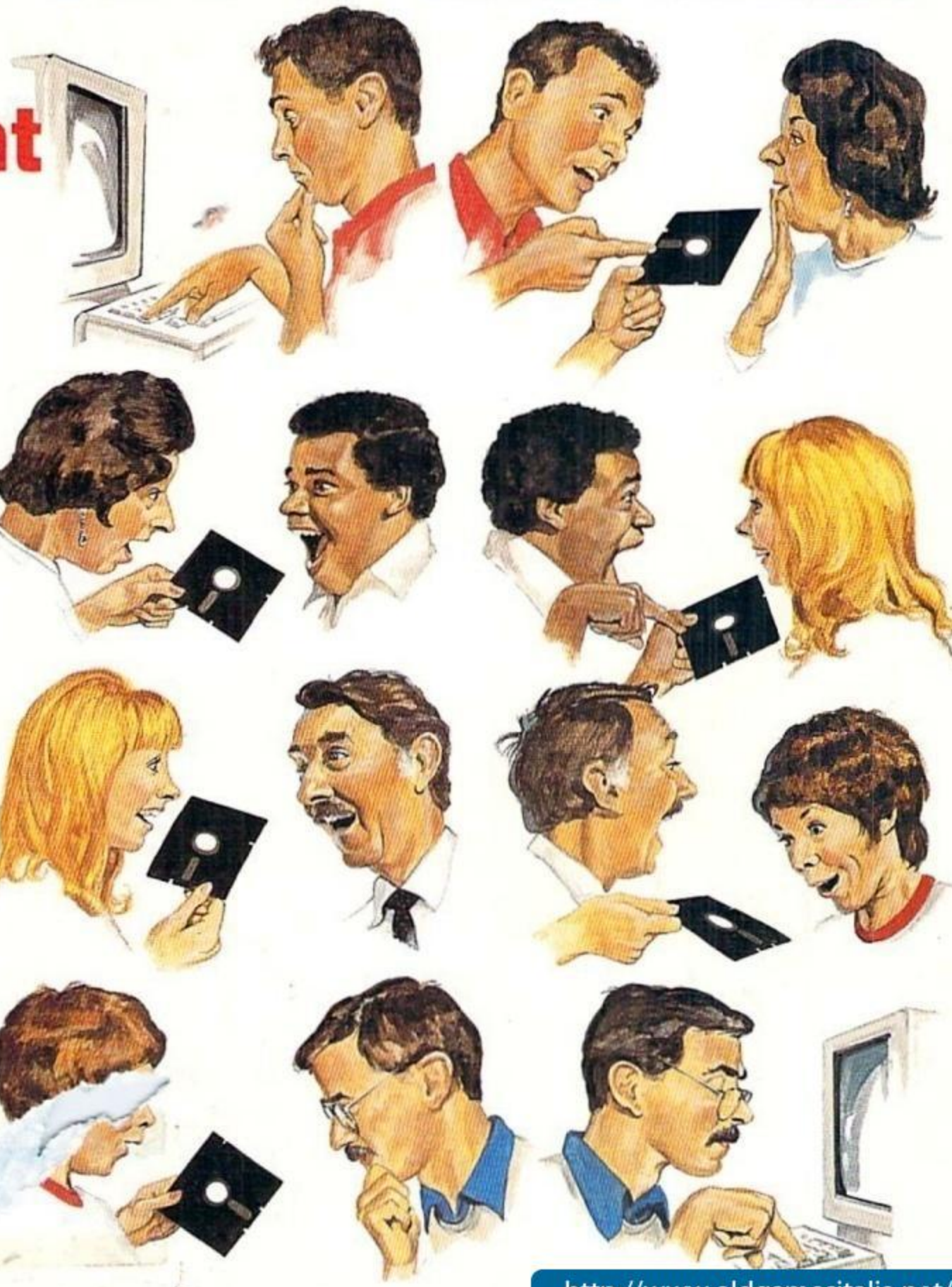

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Believe it or not, GEORAM's disk transfer rate is actually 35 times faster than the 1541, 1571, or 1581 disk drive! This means that screens redraw in a flash, and that your Commodore doesn't waste time spinning disks looking for data. GEORAM makes the GEOS family of programs faster and more powerful than ever. NOTE: GEORAM is designed for use ONLY in the GEOS environment—it cannot be used with non-GEOS software.

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64C Computer 54574 $129.95

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1351 Mouse C64/C128	37885	$32.95
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The Amiga versions of the Minimodems are equipped with a female connector to plug directly into the Amiga 500 or 2000. They need no external wall plug for power, and they use the Amiga's audio output for maximum fidelity.

Minimodem-C24 (2400 Baud for C64/C128)	88148	$79.95
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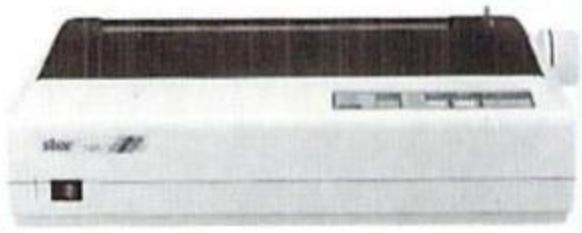

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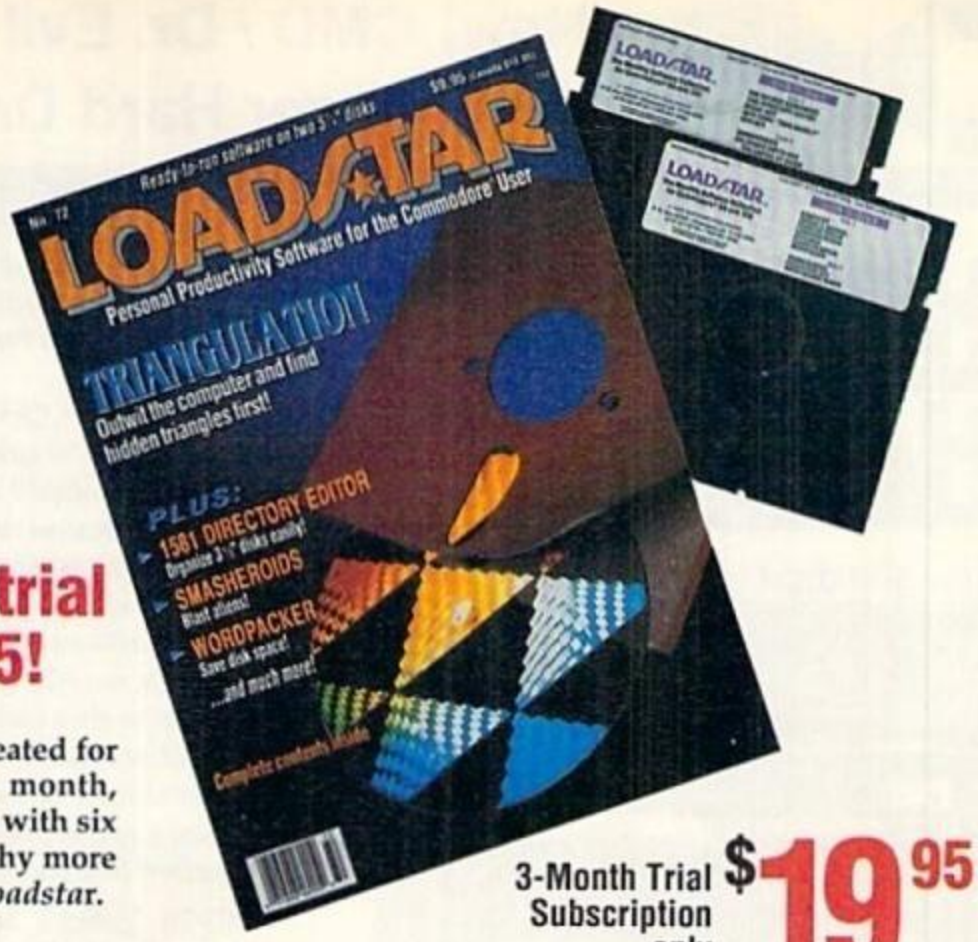

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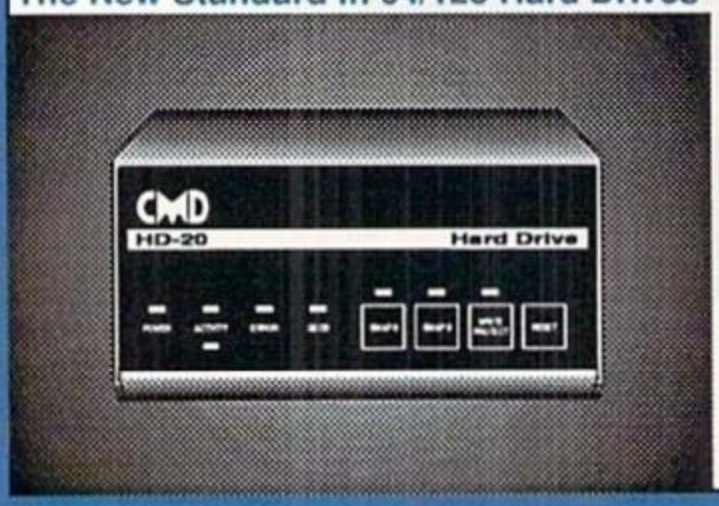

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- Supports using the CMD HD hard drive via parallel for faster hard drive access.
- RAM disk drivers allow use of as much available RAM as possible - no longer limiting you to a 1541 or 1571 sized RAM disk.
- Integrated Control Panel replaces the Preferences Manager and allows you to contour the gateWay to your choice of colors, screen pattern, printer driver and input driver.
- Task switching via our Switcher allows you to move instantly between two applications.
- An all new trash can structure which allows you to retrieve multiple files from the trash can.
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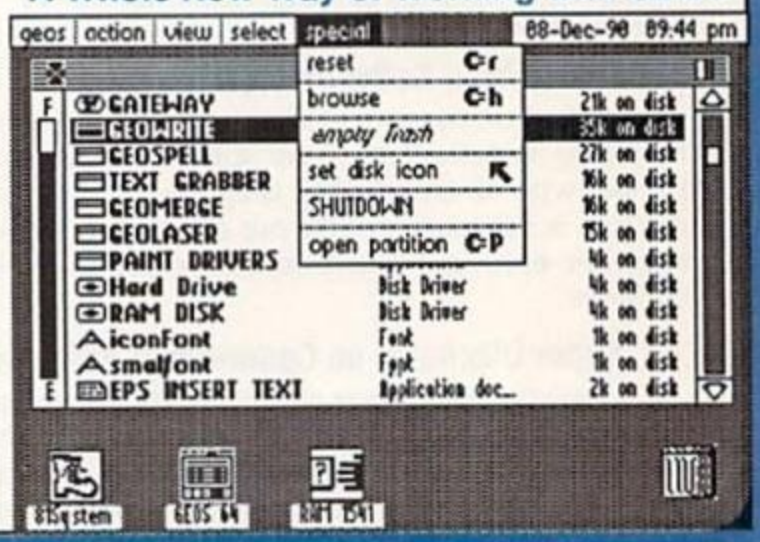

gateWay 64 $29.95 • gateWay 128 $29.95 • Both $39.95 • Shipping: UPS Ground $5.00

Note: The gateWay requires a Commodore 64 or 128, minimum of one disk drive, a mouse or joystick and GEOS 2.0 for operation.

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CMD / Dr. Evil Labs *SWIFT*Link-232 Serial Cartridge

A Real RS-232 Serial Port for the Commodore 64 or 128

SWIFTLink-232 gives you a true RS-232 port with the ability to communicate at speeds from 300 to 38,400 bps, plus true 1200 and 2400 bps using Hayes compatible modems. Experience the power of high speed modems and fast data transfers directly to other computers. SWIFTLink plugs easily into your computer's expansion (cartridge port) and provides an industry standard IBM-AT style serial port. As an added bonus, SWIFTLink comes complete with file transfer software (FTP) plus many popular shareware terminal programs such as Desterm 128 and NovaTerm for the C-64. SWIFTLink is compatible with most hardware devices designed for the Commodore 64 and 128. Note: SWIFTLink serial Cable (DB-9 to DB-25) is required for use with most modems.

SWIFTLink-232 Cartridge $39.95 SWIFTLink Cable $9.95

Shipping: US: **$5.00** (Cartridge), **$3.00** (Cable), **$6.00** (Both). Canada add **$4.50.**

CMD / Dr. Evil Labs SID SYMPHONY Stereo Cartridge

The Realism of Stereo Sound on your Commodore 64 or 128

The STEREO SID Cartridge effectively adds a second complete SID chip to your Commodore 64 or 128, giving you a total of 6 separately controllable voices. SID SYMPHONY may be attached to your home stereo or most amplified speaker systems to provide you with whole new dimension in sound. Create your own stereo music using the Robert Stoerrle's Stereo Editor (which we include free with *Compute!'s Enhanced SID Player* book), or just enjoy the many hundreds of available songs by using Mark A. Dickenson's Stereo Player software (included free with the SID SYMPHONY Cartridge). If you're interested in creating your own music files, be sure to get a copy of *Compute's Music System for the Commodore 128 and 64: The Enhanced SID Player.*

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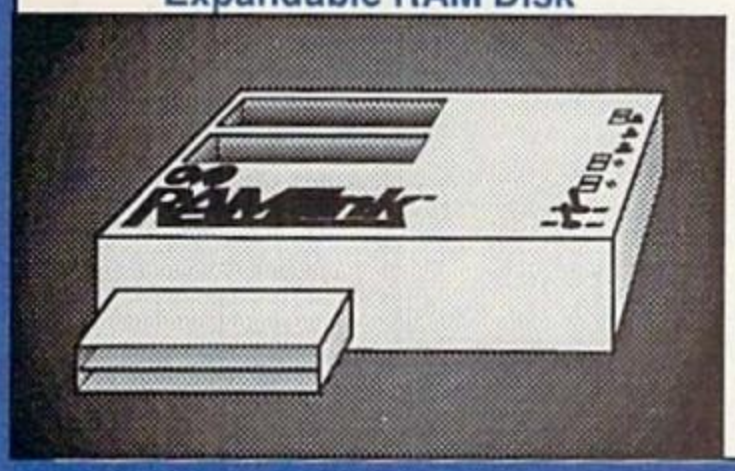
Power Backed REU Interface and Expandable RAM Disk



RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REU's). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- **Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.**
- **Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.**
- **Pass-Thru connector allows use of cartridge port peripherals such as utility cartridges.**
- **Reset, Disable, Direct Access mode and SWAP functions are all standard features.**
- **RAM port provides power back-up to REU's.**
- **Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.**
- **Includes separate power supply - optional battery available to protect against power failure.**

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RAMCard w/ 1 Mb (if purchased separately)	*$149.95		

*Add $90.00 per Mb for additional RAM up to 4Mb. Higher capacities - CALL. Prices and specifications subject to change without notice.

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Both RAMLink and RAMDrive Include RL-DOS

- Allows commercial software to access all available RAM as a high-performance RAM Disk.
- gateWay software for GEOS use available at no additional charge.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
- Up to 31 1541/1571/1581 emulation or Native mode partitions, plus true subdirectories.
- Includes built-in JiffyDOS Kernal for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCOPY) included.
- Many other features, including CMD's exclusive device number SWAP functions.

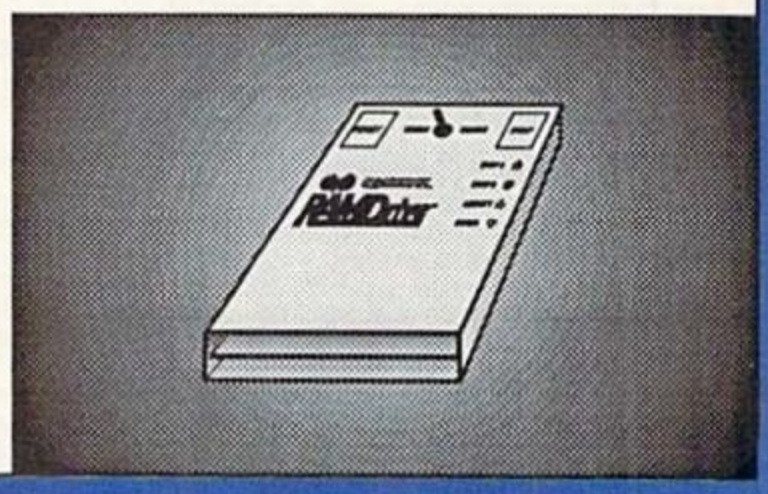
RAMLink or RAMDrive - Which one is right for you?

Both RAMLink and RAMDrive give Commodore users powerful features never before available in a RAM expander. RAMDrive is intended mainly for those who do not require the high RAM capacity of RAMLink (up to 16 Mb), RAMLink's Pass-Thru port or the parallel port for communicating with the CMD HD Series of hard drives. RAMDrive is an excellent choice for those who desire portability since the internal battery pack can keep the contents of RAMDrive intact for several days. RAMLink is the perfect choice for GEORAM owners who want the ability to use that device with programs other than GEOS. RAMLink has a built-in RAM Port for easy use with a GEORAM or Commodore REU. No matter which CMD RAM device you select, you'll benefit from the fantastic capabilities of a high speed RAM disk equipped with RL-DOS and the outstanding value of CMD support.

RAMDrive - A High Performance Battery Backed RAM Cartridge

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD Series hard drives. This DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Expansion systems.

RAMDrive™



- **Compatible with vast amounts of commercial software as an ultra-fast RAM disk.**
- **Power back-up eliminates the loss of files upon powering down the computer while the built-in battery protects data during transportation or power outages.**
- **Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.**
- **DOS includes JiffyDOS Kernal routines for high speed disk access with JiffyDOS equipped disk drives.**
- **Software for copying and GEOS compatibility included.**
- **Reset switch allows computer reset without loosing data in RAMDrive.**
- **Reset, Disable and SWAP functions are all standard features.**

RAMDrive w/512K $149.95 **RAMDrive w/1 Mb $199.95** **RAMDrive w/2 Mb $289.95**

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RUNning Ruminations

Where to Turn for Help

"Where can I get help for my computing problem?"

We hear this question frequently at this stage in the Commodore eight-bit market, as other sources of information dry up. At *RUN*, we have always enjoyed helping readers with their computing problems. But, since our time and resources are limited, we advise readers to take advantage of other avenues as well.

First and foremost, we encourage you to hook up with your local user's group, maybe the staunchest line of defense against nagging computing concerns. There you'll find knowledgeable users ready and willing to help you. These clubs offer information through software, BBSs and newsletters, as well as personal support to help you get started and continue on your way in your computing journey.

Computing is like anything in life: The more effort and energy you expend, the more satisfaction you derive.

You'll soon realize that others have (or have had) similar questions and problems to yours. Your "dumb question" has been asked and answered many times at user group meetings. Once over these initial hurdles, you'll soon find yourself in a position to help other newcomers.

Second (sounding like an advocate for the Project Literacy campaign), we tell you to READ, READ, READ—anything you can get your hands on: magazines, books, manuals, newsletters. You'll be amazed at the breadth and variety of computer books and magazines at your local bookstore or library. You'll find much information that applies to your particular situation.

Third, get online. This is an often overlooked source of information for beginning and experienced users. Several companies in this market use these boards to answer users' questions about their products. Electronic networks offer you the opportunity to meet other users, ask questions, attend forums, download software and have loads of fun.

While many users may be intimidated at the prospect of "logging on" to an electronic network, the process is easier than you might think. Refer to our feature in this issue ("Commodore Connection," p. 24) to see how it's done.

If telecommunicating is not your bag, you don't like to read, and you're not sociable enough to consider joining a user's group, there are still other sources of information. Visit computer shows, go to computer dealers and contact manufacturers (including Commodore) for product information and assistance.

No big mystery here. Like anything else in life—sports, gardening, coin collecting, or any other hobby or interest—the more effort you put in, the more satisfaction, productivity and enjoyment you will derive.

No one was born with an innate knowledge of computing. We all had to learn. Some of us taught ourselves; some learned with the help of a patient friend. But we were all computing dummies at some point. Fortunately, this condition need only be temporary.

Dennis Brisson

Dennis Brisson
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MAGIC

Speed up your 64, make graphics mode more convenient and dust off your 1541.

By TIM WALSH

$5B9 BASIC SPEED-UP 64

If you're looking for a way to make your programs run faster, try Basic Speed-Up 64. Adding lines 10000 through 10030 to your Basic programs will make them run about three percent faster. While this program disables the Run/Stop key, it does not disable the effects of a run/stop-restore keypress.

Adding a Gosub10000 slows down the Goto command if the target line is less than the source line. However, the overall increase in speed compensates. Though three percent does not seem significant, in the course of an 8-hour day it will cut approximately 14 minutes from your processing time.

```
Ø  REM BASIC SPEED UP 64 – RICHARD PENN                    :REM*179
1Ø  GOSUB 1ØØØØ                                           :REM*93
2Ø  PRINT CHR$(147):POKE 1,55:PRINT"NORMAL BASIC SPEED:";
    :CLR:GOSUB5Ø                                          :REM*1Ø7
3Ø  POKE 1,53:PRINTCHR$(18)"FASTER BASIC SPEED:";:CLR:GOSUB
    5Ø                                                    :REM*19Ø
4Ø  END                                                   :REM*168
5Ø  TI$="ØØØØØØ":FOR T=1 TO 1ØØØ:A=A+1:NEXT:X=TI:PRINT
    X CHR$(157)" JIFFIES":RETURN                          :REM*245
9999  REM BASIC SPEED UP ROUTINE BELOW                    :REM*248
1ØØØØ  A=65535:POKE1,55:POKE56334,Ø:POKE95,Ø:POKE96,16Ø
       :POKE 9Ø,255:POKE91,255                            :REM*72
1ØØ1Ø  POKE88,255:POKE89,255:SYS41919:POKEA,PEEK(A):POKE
       56334,1:POKE56324,149                              :REM*34
1ØØ2Ø  POKE56325,66:POKE42926,76:POKE42927,177:POKE42928,
       167:POKE42977,76                                   :REM*26
1ØØ3Ø  POKE42978,228:POKE42979,167:POKE1,53:RETURN
                                                          :REM*194
```

RICHARD PENN
MONTREAL, QUEBEC, CANADA

$5BA 64 SCREEN DIVIDER

When your C-64 displays an image in Graphics Mode, you're at a disadvantage should you need to type in additional commands and still preserve the current image. Before, you could either type blindly, not seeing your cursor or text, or press run/stop-restore and clear the graphic. This routine gives you five lines of text area at the bottom of the graphics screen.

Activated with SYS 49278, you can keep it in your collection of programming utilities, ready to be accessed as needed. Not only is your graphic image preserved, but you can also view the effects of changes typed in Direct Mode.

```
Ø  REM 64 SCREEN DIVIDER – JASON MATAKIS                   :REM *99
1Ø  FOR T=49152 TO 4929Ø:READ D:CK=CK+D:POKE T,D:NEXT
                                                           :REM*9
2Ø  IF CK<>14994 THEN PRINT "ERROR IN DATA...":END         :REM*69
3Ø  M=1:POKE 49156,M                                       :REM*17
4Ø  SYS 49278                                              :REM*1
5Ø  FOR T=1 TO 18:PRINT"{CRSR DN}":NEXT: PRINT "TYPE TEXT
    HERE..."                                               :REM*94
6Ø  DATA 246,6,2Ø9,1,2,173,17,2Ø8,41,127,141,17,2Ø8,173,25,2Ø8,41,
    1,2Ø8                                                  :REM*3
7Ø  DATA 16,169,1,141,26,2Ø8,173,3,192,24Ø,3,76, 49,234,76,119,
    192,173,3                                              :REM*58
8Ø  DATA 192,141,18,2Ø8,2Ø8,37,173,17,2Ø8,41,223,141,17,2Ø8, 173,
    22,2Ø8                                                 :REM*194
9Ø  DATA 41,239,141,22,2Ø8,173,2,192,141,3,192,173,33,2Ø8,141,Ø,
    192,173                                                :REM*163
1ØØ  DATA 1,192,141,33,2Ø8,24,144,33,173,17,2Ø8,9,32,141,17,2Ø8,
    173,4,192                                              :REM*121
11Ø  DATA 41,2,1Ø,1Ø,1Ø,13,22,2Ø8,141,22,2Ø,8,169,Ø,141,3, 192,173,
    Ø,192                                                  :REM*52
12Ø  DATA 141,33,2Ø8,169,1,141,25,2Ø8,1Ø4,168,1Ø4,170,1Ø4,24,64,
    12Ø,169,5                                              :REM* 234
13Ø  DATA 141,2Ø,3,169,192,141,21,3,88,96                  :REM*161
```

JASON MATAKIS
FARIBAULT, MN

$5BB CHAOS GRAPHICS 64

There is much interest in the study of chaos and the repetitive designs created by mathematical equations, so I wrote a program for the C-64 to demonstrate it. Chaos Graphics 64 applies the principles of chaos to create an unusual, eye-catching graphic pattern on the screen, using the RND statement to generate the random numbers needed.

```
Ø  REM CHAOS GRAPHICS 64 – MIKE TRAUM                      :REM*56
1Ø  A=5Ø:B=169:X(1)=B:X(3)=A:X(5)=269:Y(1)=3Ø:Y(3) =B:Y(5)=
    B:X=A:Y=B                                              :REM*2Ø5
2Ø  POKE 5328Ø,1:POKE 53272,PEEK(53272)OR 8                :REM*184
3Ø  POKE 53265,PEEK(53265) OR 32                           :REM*43
4Ø  FOR I= 8192 TO 16191:POKE 1,Ø:NEXT                     :REM*2Ø9
5Ø  FOR I=1Ø24 TO 2Ø23:POKE I,1:NEXT                       :REM*17
6Ø  R=INT(RND(1)*6)+1                                      :REM*1Ø3
7Ø  FOR K=1 TO 5 STEP 2                                    :REM*214
8Ø  IF R=K OR R=K+1 THEN X=INT ((X+X(K))/2):Y=INT((Y+Y(K))
    /2)                                                    :REM*12
9Ø  NEXT                                                   :REM*22Ø
1ØØ  CH(INT(X/8):RO=INT(Y/8):LN=Y AND 7:BI=7–(X AND 7)
                                                           :REM*125
11Ø  BY=8192 + RO*32Ø+8*CH+LN                              :REM*6Ø
12Ø  POKE BY, PEEK(BY)OR (2 {UP ARROW}BI)                  :REM*1ØØ
13Ø  GOTO 6Ø                                               :REM*5
```

MIKE TRAUM
MATTON, IL

$5BC DISKNAME/DIRECTORY COLORIZER 64/128

Formatting with Diskname/Directory Colorizer will liven up your work disks. After typing it in, make either the disk's name or the entire directory listing the color of your choice.

After typing in the program and saving it to disk, get a pre-

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viously formatted work disk and place it in the drive. Run the program and enter a color for either the disk name or the directory. Finally, enter a new name for the disk, and it will give it a 'quick' format to complete the process. The color changes only affect 64 mode and the C-128's 40-Column mode.

```
Ø  REM  DISK COLORIZER – CHARLES JONES                    :REM*254
1Ø  INPUT "(N)AME OR (D)IRECTORY";A$                      :REM*157
2Ø  C$="{CTRL 1} {CTRL 2} {CTRL 3} {CTRL 4} {CTRL 5} {CTRL 6}
    {CTRL 7} {CTRL 8} {COMD 1} {COMD 2} {COMD 3} {COMD 4}
    {COMD 5} {COMD 6} {COMD 7} {COMD 8}                   :REM*12
3Ø  IF A$="N"  THEN X$="{COMD 7}";GOTO 6Ø                 :REM*1Ø8
4Ø  IF A$="D" THEN X$="";GOTO 6Ø                          :REM*34
5Ø  PRINT"IMPROPER INPUT...":GOTO 1Ø                      :REM*66
6Ø  INPUT "DIRECTORY COLOR Ø – 15";C                      :REM*2Ø2
7Ø  DC$=LEFT$ (C$,C)                                      :REM*239
8Ø  PRINT DC$:INPUT"NAME OF DISK";DN$                     :REM*8Ø
9Ø  PRINT "INSERT BLANK FORMATTED DISK & PRESS A KEY"
                                                          :REM*19
1ØØ  GET A$:IF A$="" THEN 1ØØ                             :REM*173
11Ø  OPEN 15,8,15,"N;"+CHR$(13)+DC$+DN$=X$                :REM*92
```

CHARLES R. JONES
PICAYUNE, MS

$5BD LOTTERY ODDS 64/128

Do you ever wonder what your odds really are when you buy a lottery ticket? Lottery Odds 64/128 shows you precisely, in either 64 or 128 mode, what your odds are of picking a winning combination from any given range of numbers.

Here's how it works: Suppose you play a lottery that has 40 numbers, 1 to 40. After running the program, type in 40 at the first prompt. Next, if your lottery allows you to choose six numbers, type in 6 at the next prompt. Your answer then appears. You might be surprised at how incredibly low your odds really are.

```
Ø  REM LOTTERY ODDS 64/128 – EDWARD NOWAK                 :REM*1Ø
1Ø  INPUT "TOTAL # OF NUMBERS";N                          :REM*138
2Ø  INPUT "HOW MANY SELECTED";R:IFR=1 THEN 2Ø             :REM*1Ø4
3Ø  K=(N–R)+1:A=K:FOR A=A+1 TO N:K=K*A:NEXT A             :REM*2Ø8
4Ø  L=1:FOR J=1 TO R:L*J:NEXT J                           :REM*41
5Ø  C=K/L:PRINT "TOTAL NUMBER OF COMBINATIONS="C:
    GOTO 1Ø                                               :REM*2Ø7
```

EDWARD NOWAK
FARMINGTON, CT

$5BE SCREEN PRINT 64/128

Designed for either the 64 or 128 40-Column mode, Screen Print 64/128 prints all the text on the screen as needed.

After you've typed in and saved the program to disk, run it, and whatever text is on the screen will be directed to the printer. If you'd like Uppercase/Graphics output, remove the 7 in the first statement in line 10 so that it reads:

```
OPEN 1,4
```

The program as listed below is a stand-alone program. To use it as a subroutine, keep lines 10 through 50 near the beginning of your main program. Let the Gosub command reference line 100 (which can be renumbered, of course) and change the end statement in line 140 to a Return statement.

```
Ø  REM PRINT SCREEN 64/128 – CALVIN PRESLEY               :REM*46
1Ø  OPEN1,4,Ø:PRINT#1,CHR$(27);"V";CHR$(14)               :REM*249
2Ø  DIM C$(255):FOR I=Ø TO 31:C$(I)=CHR$(I+64):NEXT       :REM*98
3Ø  FOR I=32 TO 63:C$(I)=CHR$(I):NEXT                     :REM*169
4Ø  FOR I=64 TO 95:C$(I)=CHR$(I+32):NEXT                  :REM*233
5Ø  FOR I=96 TO 127:C$(I)=CHR$(I+64):NEXT                 :REM*167
6Ø  FOR I=Ø TO 127:C$(I+128)=CHR$(I):NEXT                 :REM*13
7Ø  FOR I=1Ø24 TO 2Ø23:X=PEEK(I):A$=C$(X)                  :REM*2Ø1
1ØØ  IF X>127 THEN S$=S$+CHR$(18)+A$+CHR$(146):T=T+1
                                                          :REM*6Ø
11Ø  IF X<=127 THEN S$=S$+A$:T=T+1                        :REM*64
12Ø  IF T=4Ø THEN PRINT#1,S$:S$="":T=Ø                    :REM*25
13Ø  NEXT                                                 :REM*5
14Ø  PRINT#1:CLOSE1:END                                   :REM*143
```

CALVIN PRESLEY
BRIGHTON, MO

$5BF SPRITE EXPAND 64

Here's one of the ultimate sprite demos of all time—a sprite stretcher that creates an animated effect by expanding and contracting sprites of various sizes. Sprite Stretch 64 overcomes the two-sprite size limitation imposed by the C-64 by vertically expanding the sprites in a rapid pixel-by-pixel motion.

Pressing the space bar after running the program displays a second set of animated sprites.

Sprite Stretch is sensitive to timing, especially on older versions of the C-64. If the program doesn't work properly, remove line 0 and save the revised program. Reboot the computer, then load the revised program. It should run fine.

```
Ø  REM SPRITE STRETCH 64 – RICHARD PENN                   :REM*39
1Ø  GOTO 5Ø                                               :REM*14Ø
2Ø  X=56321:Y=239:POKE 56333,127                          :REM*146
3Ø  POKE A,B:POKE A,C:IF PEEK(X)>Y THEN 3Ø                :REM*142
4Ø  POKE 56333,129:RETURN                                 :REM*178
5Ø  Z=22:POKE 5328Ø,Ø:POKE 53281,Ø                        :REM*64
6Ø  FOR T=16256 TO 16319:READ D:POKE T,D:NEXT:FOR T=2Ø4Ø
    TO 2Ø47:POKE T,254:NEXT                               :REM*23
7Ø  V=53248:FOR T=39 TO 46:POKEV+T,12:NEXT:POKEV+37,15:
    POKEV+38,11:POKEV+28,255                              :REM*99
8Ø  FOR T=ØTO14STEP2:POKEV+T,24+J:J=J+24:NEXT:PRINT
    CHR$(147)TAB(9)"SPRITE STRETCH"                       :REM*1Ø1
9Ø  FOR T=1TO15STEP2:POKEV+T,5Ø+I:I=I+Z:NEXT:POKEV+
    29,255:POKEV+21,255                                   :REM*94
1ØØ  DATA 42,17Ø,17Ø,37,85,87,37,85,87,38,15Ø,151,38,182,183,38,
    182,183                                               :REM*23Ø
11Ø  DATA 38,182,183,38,182,183,38,17Ø,183,38,17Ø,183,38,17Ø,183,
    38,17Ø                                                :REM*161
12Ø  DATA183,38,19Ø,183,38,182,183,38,182,183,38,182,183,38,182,
    183,37                                                :REM*131
13Ø  DATA 245,247,37,85,87,37,85,87,47,255,255,42         :REM*234
14Ø  CLR:A=53271:B=255:C=Ø:WAIT 53266,2ØØ:GOSUB 2Ø:Z=1Ø:
    GOTO 7Ø                                               :REM*6
```

RICHARD PENN
MONTREAL, QUEBEC, CANADA ■

Magic is RUN*'s forum where imaginative readers share their programming gems with other* RUN *readers. If you believe you have a bright idea to make computing easier, faster or just in general more fun, send it to: Magic,* RUN *Magazine, 80 Elm St., Peterborough, NH 03458.*

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News and New Products

Tackle your taxes and sack a few quarterbacks with this issue's New Products line-up.

By JANICE GREAVES

Taxes . . . Taxes . . . Taxes!

LA POINTE, WI—First there was Live Aid, then Farm Aid and Band Aid . . . now there's **Taxaid**! With Taxaid's updated version, you can use your C-64 or 128 to accurately prepare your 1990 tax returns. The program is completely menu-driven, and a detailed manual leads you step-by-step through the data entry.

Taxaid prints Schedules A–E, SE and Form 2441 on plain paper in a format that can be submitted directly to the IRS. It also prints a complete listing of pages one and two of Form 1040, which must be transferred to the official IRS form. The price is $49.95 from Taxaid Software, Inc., 800 Middle Road, La Pointe, WI 54850.

MILWAUKEE, WI—Practical Programs has also revised their **Tax Command** tax preparation software. This version incorporates the new IRS tax laws and forms, and allows users to file their taxes electronically either with a modem or by sending a disk. Both the 64 and 128 versions include 18 forms and schedules, and the menu-driven software is designed to walk you through the preparation without the manual. The Tax Command software is available for $59.95 from Practical Programs, PO Box 93104, Milwaukee, WI 53203. Electronic Filing is an additional cost.

ROCKVILLE, MD—A RoundTable is now available through the GEnie online service that supports Softview, Inc.'s, tax preparation software. Softview, of Oxnard, CA, publishes tax preparation software for professional and home use. C-64 and 128 users can access the RoundTable by subscribing to the online service. For more information, contact GEnie Information Services, 401 North Washington St., Rockville, MD 20850.

New from Disney

BURBANK, CA—Disney Software has a new set of learning games for your preschoolers. Mickey Mouse, Donald Duck and Goofy team up to teach colors, shapes, numbers and letters. Each of these learning adventures is designed for children 2–5 years old, so they are simple to learn and use.

Donald Duck chases runaway letters in a new game from Disney Software.

In **Goofy's Railway Express**, you ride along in the train and explore a picturesque countryside full of colored geometric shapes. Three levels of play keep kids challenged as their skills improve.

Mickey's Runaway Zoo is a hide-and-seek counting adventure. In it you help Mickey and Goofy round up animals that have escaped from Mickey's Petting Zoo. In **Donald Duck's Alphabet Chase**, Donald's alphabet pets have slipped out of the toy box, and are running around the house. You help him find them.

These adventures are sold separately at $14.95 each. Contact Walt Disney Computer Software, Inc., 500 South Buena Vista St., Burbank, CA 91505.

Play the Big Leagues

NEWARK, DE—Just when you thought football season was over! MicroLeague Sports Association, makers of MicroLeague Baseball, has released **MicroLeague Football** for the C-64 and C-128.

The game features 20 pro football rosters with real NFL players and their stats. With MicroLeague, it's your team—you're the coach. You control both offense and defense, so your team will win or lose based on your coaching ability.

The program features superb graphics, pop-up screens for mid-game access to complete offensive and defensive stats, a built-in playbook for easy play selections, and has Quick-Play and Expert modes.

Special add-on disks include a General Manager/Owner disk for creating your own "dream team," and season disks that let you coach an NFL team from almost any era. Available for $29.95 from MicroLeague Sports Association, 2201 Drummond Plaza, Newark, DE 19711.

The Same Old Song And Dance

WEST CHESTER, PA—Commodore executives have played musical chairs again. James Dionne of CBM Canada has replaced Harold Copperman as president of CBM's U.S. division.

The change came with a 10–15 percent layoff of CBM's 600 U.S. employees. According to *The Wall Street Journal*, the layoffs resulted from CBM's decision to consolidate manufacturing in Hong Kong, and from an overall effort to boost its slumping profit margin.

Metropolis

PURCHASE, NY—If you're bored with the traditional online services, you get both productivity and fantasy with **Metropolis**, an online service for adult interactive-game enthusiasts. Presented as an imaginary city, Metropolis offers a complete range of services and activities. Metropolis incorporates online shopping, messaging, and chat and news services with fantasy and gaming for comprehensive entertainment. Additional information is available from Minitel Services, 2900 Westchester Ave., Suite 101, Purchase, NY 10577.

Announcing Word Writer 5

DEERFIELD, IL—This is the latest version of the popular word processing program. **Word Writer 5** sports many added features, including built-in graphics and fonts. You control the font type, size and

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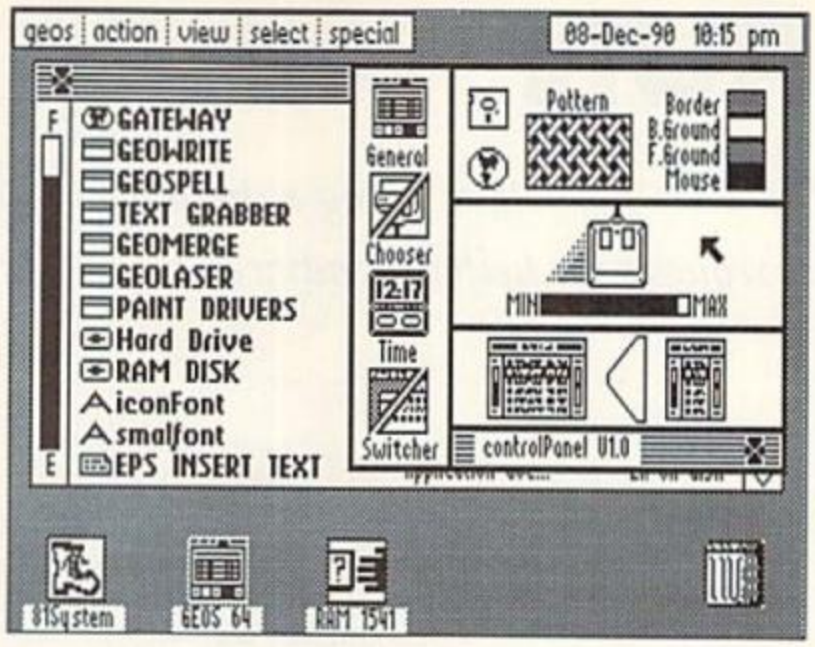

CMD's alternative to the GEOS deskTop.

style, and you can set up the document with features like word wrap, forced page breaks and margin justification (left, right or justified). A graphics converter allows you to read, crop, flip and invert GEOS and DOODLE pictures.

Word Writer 5 also features two-way printout, Search, Search-Again and Replace, an installation program, scrolling, text importing and text exporting.

Word Writer 5 costs $29.95 plus shipping. For more information, contact Timeworks, 444 Lake Cook Road, Deerfield, IL 60015.

JiffyDOS Enhancement

EAST LONGMEADOW, MA—**JiffyMON** is a Machine Language Monitor program designed especially for use with the JiffyDOS-64 disk drive speed enhancement system. With JiffyMON, you use Basic, JiffyDOS and JiffyMON commands, so it is perfect for using with combined ML/Basic programs. JiffyMON is co-resident with Basic, so it allows simultaneous use of other utilities, but it uses no Basic, $C000–$CFFF or zero-page memory. It allows hidden RAM access under the Basic and Kernal RAMs and beneath the I/O area, and has a built-in sector editor and a disk drive monitor. This program offers a command set which includes all the functions of other ML monitors, plus debugging commands such as Breakpoint Set, Quick Trace and Walk. JiffyMON is available for $19.95 from Creative Micro Designs, 50 Industrial Drive, PO Box 646, East Longmeadow, MA 01028.

Update Your Desktop With GateWay

EAST LONGMEADOW, MA—More than a replacement for the deskTop, **gateWay** offers a streamlined approach to file management under GEOS that is new to the C-64 and 128. GateWay supports three drives and allows auto swapping for applications that recognize only two drives. Users with and without REUs can trash Configure, because gateWay lets you integrate your device drivers directly into the gateWay itself. It also offers the added convenience of task switching, individually defined disk icons, a built-in, integrated control panel and features like the trash can, a proportional slider and a fuel gauge. GateWay requires a minimum of one disk drive, a mouse or a joystick and GEOS 2.0 for operation. GateWay is available for $29.95 from Creative Micro Designs, Inc., 50 Industrial Drive, PO Box 646, East Longmeadow, MA 01028.

Communications Software For the C-64 . . .

SALEM, MA—Parsec, Inc., announces its new communications package for the C-64. By itself, **Bell Term C-64** supports 300–2400 baud, but when paired with Swiftlink by Creative Micro Designs, it can support 19,200 baud between computers. It can unarc files from within the program, and provides 80-column output. It features 32 user-defined macro keys and an automatic log-on directory file which allows you to preset 50 telephone numbers. Bell Term supports REUs as disk drives and Y-modem protocol. Bell Term is available for $29.95 plus shipping through Parsec, Inc., PO Box 111, Salem, MA 01970.

. . . And for the 128

TORONTO, ON, CANADA—128 and 128D owners can now get online with new software from Shining Star. **Dialogue 128 version 2.2** features a powerful auto-execute script language that allows fully automated and unattended operation. Other features include a substantial buffer capacity, hotkeys, drop-down menus and your choice of keyboard, joystick, mouse or trackball options. Dialogue 128 supports over 30 modems, REUs, all disk drives, 64K Video RAM, 1571 and 1581 burst mode and partitions. Dialogue 128 is $49.95 (U.S.) or $59.95 (Canada) plus shipping from Shining Star Software, #1205-1640 Bayview Ave., Toronto, ON, Canada, M4G 4E9.

Express Yourself

NEW YORK, NY—Hi Tech Expressions has three new printing kits. The **Beetlejuice Print Kit** lets you print banners, signs and cards of your favorite characters: Beetlejuice, Lydia, Delia and more. **Gremlins 2 Print Kit** lets you design and print signs, posters and banners using the stars of Gremlins 2, Gizmo and Mohawk. The space-age Jetsons and stone-age Flintstones add fun to the **Hanna Barbera Print Kit**, which lets you make signs, cards, coloring books and more.

Each kit is available for $14.95 from Hi Tech Expressions, 584 Broadway, New York, NY 10012.

Design a Masterpiece

SALEM, MA—**Masterpiece Designs** by Parsec, Inc., is unique clip-art software for the C-128. Parsec has digitized old and rare border designs and other intricate patterns created hundreds of years ago. The package has over 140 separate border patterns, and each pattern includes large border sections and small pieces, so you can create composite borders of your own design. Available for $34.95 from Parsec, Inc., PO Box 111, Salem, MA 01970.

Manage Your Mailings

PITTSBURGH, PA—**Mailing List Manager** is designed specifically to manage your mailing lists. It prints labels, index cards and name badges. With its drop-down menus and pre-set fields, you can master it in minutes. In addition to seven pre-set fields, there are two user-defined fields. It will find any file in less than a second, and allows you to view up to 15 files simultaneously. It is available for $29.95 from Keystone Software, PO Box 8369, Pittsburgh, PA 15218. ■

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MAIL RUN

Commodore and PC users face off, a young entrepreneur speaks up and RUN *answers requests for help and advice.*

POINT-COUNTERPOINT

I purchased a C-64 the year it first came out. I enjoyed it very much and used it extensively in my home and at my office. I probably would have stayed with the C-64 if Commodore and the third party software had properly supported it. But I finally gave up in frustration. In August of 1989 I purchased a PC-AT clone, and am very pleased with it.

I have enjoyed *RUN* since the first edition. It was the best of the Commodore specific magazines, but I would like to see you publish a *RUN* about PC's with the same type of content you are presently publishing on the C-64. The present PC magazines are either product editorials, ivory-tower programming magazines or simple beginner publications.

—GALEN W. SITLER
DUARTE, CA

What a wonderful computer my C-64 is! There is nothing the "big boys" can do that I can't. They're just a little faster than I am. I ask them . . . what's the rush? I can create excellent graphics, compose music, manage my finances and investments, publish newsletters, and yes, when I've had a hard day I can sit down and vent my frustrations with a good shoot-'em-up action game.

RUN is the only magazine out there for those of us with the 8-bit machines. While other magazines devote nearly all of their space to IBM and clones and try to convert us over to MS-DOS, you at *RUN* are still standing there like a knight in shining armor, the champion of us Commodore die-hards. You are the complete source for Commodore users. I look forward to continuing my subscription for as long as you can stand alone against the MS-DOS tide. Thank you!!

—CHRISTOPHER T. SCOVEL
ATWATER, CA

THE PUBLISHER'S APPRENTICE

I am nine years old and very interested in Commodore computers. I own a 64 myself. I recently heard that a lot of computer magazines were shutting down, so I decided that there needed to be more. Then I thought, why not write my own? I was wondering what it would take to have you publish it for me? I hope it wouldn't be too much trouble.

—HOWARD ZIMMERLE
FT. DODGE, IA

Howard, instead of starting another magazine, which requires much time, effort and resources, why don't we work together to make RUN *the best magazine it can be! Tell us what articles, columns and programs you would like to read, and send us articles and programs that you have written along with your feedback. We need to know what you think. With help from readers like you, we will continue to publish the information that you want and need.*

—EDITORS

GEOS HELP

I recently acquired GEOBASIC and there are frequent allusions in the manual to *The GEOS Programmer's Reference Guide*. Where can I obtain it?

—ROBERT W. REED
WEEKS MILLS, ME

The GEOS Programmer's Reference Guide *is available for $25 from Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704; 415/644-0883. If you need further assistance with your GEOS products, call GEOWORKS Customer Service at 415/644-0926.*

—EDITORS

SOFTWARE! SOFTWARE! SOFTWARE!

Here is a hint for your readers who are tired of not finding software and company information for their C-64/128, Amiga, Plus/4, VIC-20 or PET computers. Maybe they just want to show that there are some very serious programs for the C-64/128. Well, here it is, *Software Information Commodore*, by MENU. It's an up-to-date, extensive directory of software companies and their products. The book can be found at your public library or ordered directly from MENU, PO Box MENU, Pittsburgh, PA 15241. Or call 1-800/THE MENU.

—JOHN W. REALING
SPOKANE, WA

We appreciate the mention of our company in your November '90 issue (Free Software). Your mention has brought an avalanche of mail, which is truly appreciated, as it shows the continuing interest in the 64 and 128. We need to clarify, however, that Poseidon sells only CP/M software for the 64 (with working cartridge) or the 128 (all 300+ disks). We have a catalog for the 64 ($5.50) and a 128 Master Catalog with 4 Addenda ($10). Again, many thanks.

—RALPH S. LEES, JR.
POSEIDON ELECTRONICS
NEW YORK, NY

SO WHAT DO WE DO NOW?

I'm sadly disappointed, but not totally surprised, by a response from Commodore concerning my SX-64. My SX-64 was damaged in shipment during my military move to Sicily and I wrote to CBM requesting help and ideas. They offered me neither. They said, "The SX-64 is obsolete and parts are no longer available for repair." Discontinued, yes . . . no longer manufactured, yes . . . but NOT obsolete! And I doubt very much that it is irreparable. The authorized CBM service centers who advertise in *RUN* each issue would also be surprised to hear that SX-64s cannot be repaired.

—PARK OWENS
APO, NY

My C-64 just stopped working. Could you tell me the address of the nearest repair center?

—KERVIN RENE
ST. CROIX, VI

Unfortunately, Kervin, according to Commodore (1200 Wilson Drive, West Chester, PA 19380; 1-800/448-9987), your nearest authorized repair center is in Miami.

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If anyone out there can help Kervin please write to Mail RUN!

—EDITORS

Recently I received a copy of OmniWriter for my Commodore 64, but it didn't come with any operating instructions. I have tried to contact the company, Human Engineered Software/Solid State Software, but have had no luck. How can I get the instructions?

—TERRI PENSAK
CINCINNATI, OH

That company has been out of business for some time. Your best bet is to ask other users, either through user's groups or online.

—EDITORS

WHAT'S UP DOC?

I am a child psychologist in private practice and use C-64s for my patient and medication files, spreadsheets and word processing needs. I also own a Tandy 100 which I take on trips and use to transfer letters and reports to my C-64 via a null modem cable.

The other day I was checking out the newly released Tandy FD1100 notebook computer and was wondering how I would be able to up-load files from it to my C-64?

—CHARLES CLADEL, JR., M.D.
HUMMELSTOWN, PA

According to Radio Shack, a 2400-baud internal modem is available for the Tandy FD1100. With the modem installed, you can transfer files the same way you do with your Tandy 100.

—EDITORS

MAKE MORE $$$ WITH YOUR 64/128

Your article "How to Make $$$ With Your Commodore" was enlightening. There is one area of Commodore productivity that has been overlooked, though.

Recently, there has been a real growth in the number of people who own Cam-Corders and who have taken an interest in sprucing up their projects with titles. The hardware and software to do this are formidable investments for the Macintosh and the IBM. But the the C-64 and 128 interface with the standard NTSC video input of a VCR or CamCorder. The titles I make using Video Title Shop, Video Producer, Screen F/X and Doodle have been impressive. It would not be hard to turn this into big bucks!

—GIGI CASCIO
FOREST HILLS, NY

A GROUP FOR THE GROUP-LESS

MCUA is a Commodore user's group that accepts memberships from anyone in the U.S. who does not have a user's group near them. Our services include a monthly newsletter (contributions are welcome), public domain software and a lending library and can be accessed through the mail. Membership is $15 per year. Write The Minnesota Commodore Users Association, PO Box 22638, Robbinsdale, MN 55422.

—JOHN WEHLER
ROBBINSDALE, MN

A POPULAR COMPANY

If you really want to use your 128 in a business atmosphere, get the Pocket series software. It's professional, simple to operate, fully-programmable software written by Digital Solutions of Canada. Their Pocket Writer (word processer), Pocket Filer (database) and Pocket Planner (spreadsheet) are flexible, versatile applications that let you lay out your documents the way you want them.

—THOMAS MILLER
ALLENTOWN, PA

For a review of the latest version of Pocket Writer, see the January/February 1991 issue of RUN. *Some of our readers have had trouble locating Digital Solutions. Their current address is PO Box 345, Station A, Willowdale, Ontario CANADA, M2N 5S9.*

—EDITORS

BACK TO BASICS

I used to think I began my subscription too late. I thought that all of the beginning "how to" information had already appeared in issues previous to my subscription.

But you now seem to be addressing the real folks instead of trying to talk over us. I've gotten more information from your last two issues than many of the previous ones. I think I'm typical of your readership: I don't do programming and I'm not a member of a user's group. Therefore, your ProTips and Gold Mine are valuable resources to me. Not all of us can make our Commodore machines breathe fire. If we could, we wouldn't need you!

—JON HELBERG
COTTAGE GROVE, MN

A GOOD BARGAIN

This letter is in reply to Danny Ash (Mail RUN, November 1990). I live in Canada and pay $3.95 each time I purchase *RUN*. I am not rich, but I care very little if it costs 47¢ to print *RUN*. What is important is what we get for our money!

I used to buy other Commodore magazines, but I never felt I received a good value for my money. Note that these magazines are no longer with us. On the other hand, *RUN* is a good value. It is a well-written magazine with interesting features; ProTips and GeoWatch are two of my favorites.

Our criticism is necessary when deserved, but we should also not forget to praise *RUN* for its support.

—DAVID BURNHARDT
MONTREAL, QUEBEC, CANADA

WHO SAYS IT'S A SMALL WORLD?

I typed "How Far Is It . . .?" from the August/September 1990 *RUN* and found it very easy to use. I enjoyed the program and found it accurate. I figured the earth's circumference using 7927 miles as the diameter and got 24,903.40494 miles. By using the latitude and longitude at the equator I got 24,902.0 miles. With only 1.00494 miles difference, the program was a very accurate way to figure the direct distance between locations.

—ALVAN O. WHITEHEAD
WINCHESTER, KY ■

TELL IT LIKE IT IS

Send your letters to Mail RUN, RUN *magazine, 80 Elm St., Peterborough, NH 03458. Please include your name and address.*

CORRECTION! The address for Dr. Evil Labs, manufacturer of the SID Symphony Stereo Cartridge, published in our December 1990 Holiday Shopping Guide was incorrect. The correct address is: Dr. Evil Labs, PO Box 3432, Redmond, WA 98073.

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ACTION REPLAY v5.0

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UNIQUE CODE CRACKER MONITOR

- Freeze any program and enter a full machine code monitor.
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MORE UNIQUE FEATURES

- Simple Operation: Just press the button at any point and make a complete back-up of any* memory-resident program to tape or disk.
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- Utility Commands: Many additional commands: Autonum, Append, Old, Delete, Linesaver, etc.
- Screen Dump: Print out any screen in 16 Gray Scales, Double size print options.
- Unstoppable Reset: Reset button to Retrieve System and Reset even so called Unstoppable Programs.
- Fully Compatible: Works with 1541/C/II, 1581, 1571 and with C64, 128, or 128D (in 64 Mode).
- Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys.
- Unique Restart: Remember all of these utilities are available at one time from an intergrated operating system. A running program can be Frozen to enter any Utility and the program is restarted at the touch of a key — without corruption.
- LSI Logic Processor: This is where Action Replay V gets its power. A special custom LSI chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

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- Comprehensive font editor
- Lines, points, rectangles, triangles, circles and rays
- Undo facility for last operation

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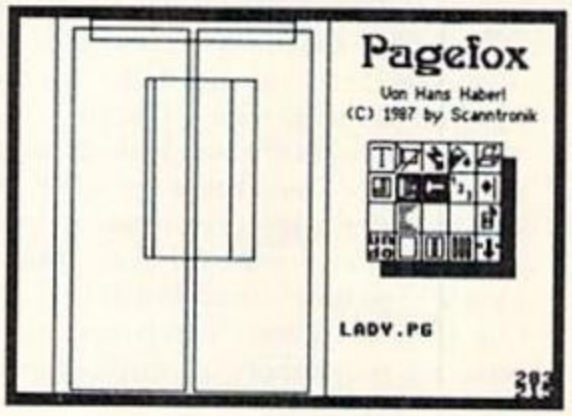

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SOFTWARE GALLERY

This issue we cover lots of ways to break out of the winter blahs,

from a beat-the-clock word game to sports, flying, strategy and other games.

PICTIONARY .....B+

Pass the Good Word

About This Game

Anytime friends or family gather at the home of a Commodore user, someone always says, "Hey, why don't we play a game on the computer?" Next time that happens at your house, you can be ready with Broderbund's new version of Pictionary.

Like its cousin Charades, Pictionary is a word-guessing game. However, in Pictionary the performer sketches clues instead of acting them out. In computer Pictionary the machine takes care of piece movement on the 55-square board, rolling the die, word selection and timekeeping (for two to four minutes). When you're ready to draw, a sketchpad, with clickable drawing tools, slides down right there on the screen!

The practice mode and drawing options, such as connected and variable-width lines, rectangles, circles, patterns and fill, are great helps in on-screen sketching. Pencil-and-paper remains easier, but getting across the idea of a person, object, place or action in an unfamiliar medium is an engaging challenge.

So, when everybody leaves, does Pictionary go back on the shelf? No way. Just pull down the menu, and click a set-up for one to four individuals. Now the program does the sketching, while you and any other players compete to guess the word it's chosen. I'd guess that at least 200 pictures are included in the 13 disk files. To space out repetitions, the program remembers which pictures it's drawn each session.

The new Pictionary boasts good speed, clean graphics and decent sound. A mouse is helpful, but not necessary. Minor glitches include an error in the fold-out manual (use insert/delete, not escape, to turn off a tool) and a few occasions when a team turn is incorrectly specified as "all play." Finally, scores are not maintained on-disk and do not determine who wins. As in the board game, the first player to reach the finish is the winner.

Sketch clues on the screen in Pictionary.

Good board games seldom make good computer games. Pictionary is an exception offering, if anything, more entertainment than the original. Expect a guaranteed party ice-breaker and a fine challenge to your creativity. *(Broderbund, 17 Paul Drive, San Rafael, CA 94903. C-64/$29.95)*

—JEFF HURLBURT
HOUSTON, TX

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

PUFFY'S SAGA .....A –

An Imaginative Adventure

That's No Kid's Stuff

Well, Puffy, now you've done it—bounced off alone and rolled down a hidden shaft. If those ghosts get you, this could be the end of Puffy's Saga!

Puffy and his girlfriend Puffyn are cute, round, furry creatures with big eyes and noses. Because they have no hands or feet, they can't run, so they "scootch" instead. The alien world they're trapped in, which you view top-down, is well-stocked with monsters. You might be dissolved by acid puddles, life-drained by ghosts, fried by dragons, lost or starved, but you won't be bored to death.

As Puffy, your scootching speed is just adequate to evade slower monsters. As Puffyn, you're faster but more vulnerable to hits. Either way, you pack an unlimited-shot pistol and can grow numerous helpful bonus items. Some, like extra speed and a super shot, enhance existing abilities. Others let you repel monsters or give you invisibility, fire breath or an overview of the maze. Most important are keys and the caches of yummy, life-boosting drumsticks. If you consume too few and get "puffed out," poof!, the game ends.

This new arcade-adventure by UBI Soft spans 34 crisp, colorful, wildly varied mazes. Each is a smooth-scrolling, multiscreen puzzle composed of corridors and trigger squares, hiding energy beams, monster guardians and more. One part of the challenge is to pick up all the pad goms and access the next level, another part is to collect goodies and build up life points. (Hint: On easy levels, do a game save just after cleaning out the drumsticks and play will restart with a completely restocked maze! Five or six trips should supply more than enough life points for several tough levels.)

On-box labeling proclaims that Puffy's Saga is entertainment software for one or two players, but it is not for two. It is a semi-tough, nicely paced challenge, and definitely entertainment. Turn down the ►

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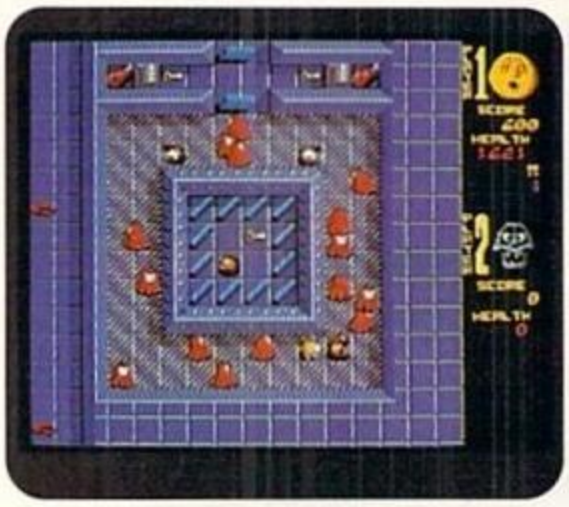

Puffy closes in on a key in Puffy's Saga.

lights, turn up the sound, hook up the joystick and slip into your Puffy suit. Long play, action-adventure fun is just a scootch away! *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95)*

—JEFF HURLBURT

F-16 COMBAT PILOT.....D

This Flyer Misses Its Target

I sometimes wonder whether games are being produced for the C-64 anymore. F-16 Combat Pilot surely wasn't. I think the developers concentrated more on porting features from the Amiga version than taking advantage of the C-64's strengths.

Combat Pilot places you in the cockpit of a General Dynamics F-16C Fighting Falcon, charged with accomplishing six missions. If you survive the first five, you're assigned to Operation Conquest, where you direct other F-16 pilots to critical targets as well as seeking your own.

As with most simulations of its ilk, the cockpit bristles with dials, gauges, status lights and digital displays. Accordingly, it takes time to learn. A command card and a heads-up cockpit display help you master the dozens of commands which control the on-board systems. You can practice flight, navigation and combat in any of the five basic scenarios.

Flying the F-16 is easy enough as you fly to the target coordinates, while outside passes a virtually featureless terrain. But jerky graphic updates and an oversensitive joystick make precision maneuvers quite frustrating. Air-to-air combat requires more luck than skill, since you can only look forward from the cockpit, and enemy positions are displayed as white line drawings with no real perspective. Thankfully, landings are automated—if you can line up with the runway.

Many features distinguish good simulations, but the C-64 version of F-16 Combat Pilot offers none of them. It fails for several reasons, foremost being its lack of respect for the C-64 gamer. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$34.95)*

—JOHN RYAN
BILOXI, MS

SKI OR DIE .....A

It's All Downhill to Great Fun and Alpine Action

Those hotdoggin' maniacs from Skate or Die have brought their unique sports philosophy to the mountains in Electronic Arts' new Ski or Die, and the wintry slopes will never be the same!

The game opens at a ski shop, where the proprietor is Rodney, your friend from the original program. He cracks a few jokes, gives some playing tips and signs you up for the program's events. You can test your skill in one contest or try all five.

There are two playing modes: practice and competition. In the latter, a record-breaking score is saved to disk. In one event, the Snowboard Half-Pipe, you hurtle through a trench on a 5-foot slab at your choice of three speeds. Points mount up as you do ollies, rail slides and other tricks off the trench's rims, floor and bumps.

Another event in which stunts earn points is Acro Aerials. The launching pad is a towering ski jump, and the fluidity and variety of your maneuvers on the way down determine your score. Perhaps the hardest event on the disk is the Downhill Blitz. Though fancy tricks again earn points, your main goal is to avoid spills and post a good time.

The Snowball Blast is Ski or Die's most frenzied contest. In it, you cream as many punk penguins and nasty brats as possible before they bury you with their snowballs.

Up to six players can take turns in these four events, but the Innertube Thrash allows only head-to-head competition. If a friend isn't available, you can take on the infamous Lester, also back from Skate or Die. You and your foe race down a hill in old truck innertubes, encountering spikes, air pumps and pocket knives along the way. Touching them deflates or inflates your innertube, or slows your opponent. You score by picking up helpful objects and finishing first.

Ski or Die offers a lot and executes beautifully. The graphics and animation are terrific, the joystick control is precise, and the humor is appealing. The program's only problem is a 45-second loading time for events—but the wait is worth it. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95)*

The Acro Aerial competition in Ski or Die.

—WALT LATOCHA
OAK PARK, IL

BLADES OF STEEL.....B+

You Stick to the Action On Konami's Ice

Whether you're playing ice hockey or designing a computer game, you must do many things well to beat your competition. Though the producers of Blades of Steel deliver the action they promise, they left out features that could have made it the top C-64 hockey simulation.

Konami's translation of the popular coin-op and Nintendo game pits you against either the computer or a friend. The program has exhibition and tournament modes, and includes three difficulty levels for solo play: junior, college and pro.

As play begins, you choose one of eight cities for your six-person team to represent. Then it's onto the ice for the face-off and the action. It takes skill to finesse the puck from one team member to another until reaching the optimum position for a shot-on-goal.

Although the Blades of Steel manual indicates otherwise, the computer generally determines which skater you control when the other team is trying to score. If you're skillful, you can steal the puck by knocking down the player in possession.

On-screen fights are included. When combatants reach a certain level of violence, the picture switches to a close-up. Surprisingly, it's the loser who ends up ejected from the game! The game also includes penalty shots for slashing fouls, and overtime for tie games.

Blades of Steel succeeds as an arcade contest. Its graphics are crisp, and its

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control system is superb. Best of all, the animation really gives a feel of motion on ice. Unfortunately, other hockey programs offer more features; SuperStar Ice Hockey, for instance, lets you act as coach and owner, as well as skater.

However, if you're satisfied with fast and hard rink excitement, no program provides better than Blades of Steel. *(Konami, Inc., 900 Deerfield Parkway, Buffalo Grove, IL 60089. C-64/$29.95)*

—WALT LATOCHA

BLOCKOUT.....B+

Square in the Fun Category

Thanks to Tetris, you already know that a pile of blocks can be a real ball. Well, so does California Dreams. Their latest entry in the fitting-stuff-together sweepstakes boasts 3-D perspective, user-sizable pits and three-piece sets!

It's called Blockout because, when you form a complete layer of blocks, zing!, they're out, everything on top moves down, you collect a hefty point bonus, and there's more room in the pit. The 41 pieces, which are composed of one to five blocks each and are either cookie-cutter flat or like sections of a Soma Cube, stick out every which way.

The computer creates pieces one at a time and starts them at the top of the pit. As a piece notches down, your job is to rotate, flip and position it to build complete block layers. You have nearly a minute at the lowest level and speed settings, but just a few seconds at level 9. The faster you place a piece, the more points it scores. Once it locks into place, the next piece is generated. The game ends when you're satisfied that nobody can top your score, or when pieces overflow the pit.

The first amazing thing you'll notice about Blockout is that, by golly, it's doable! The pit bottom and walls are marked off in squares to facilitate positioning, and the active piece is a transparent line drawing, so the pit and contents (color-coded by level) are always visible. The absence of a joystick or mouse control option for play is a weakness, but a special practice mode really helps you learn the keyboard commands. Most important, you set the pit dimensions, starting speed, and piece variety and complexity, all via a single, user-friendly menu (where a mouse can be used); and separate top-ten-score rosters are maintained on-disk for each pit-size/piece-set combination!

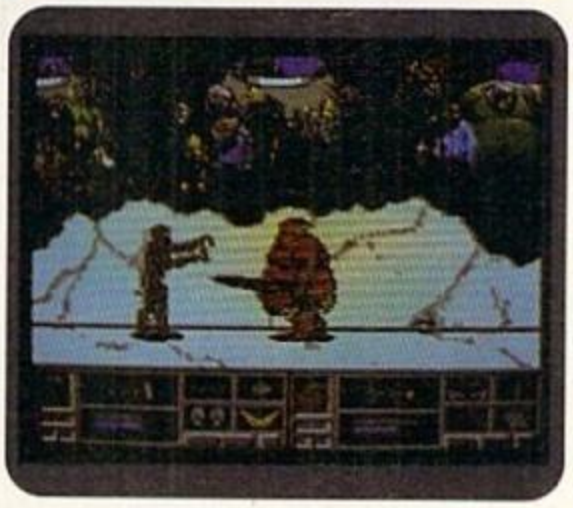
Blockout, with its accompanying 25-page manual and command card, offers good speed and attractive graphics, although just adequate sound effects and no in-play music. Maybe the Dreams people were aiming for a pure challenge. Tough? You bet. Plan to log 30 minutes or so of learning time, then look forward to hours of block-busting fun. *(California Dreams, 780 Montague Expressway, #403, San Jose, CA 94086. C-64/$29.95)*

—JEFF HURLBURT

MONDU'S FIGHT PALACE.....A –

This Sci-fi Wrestling Game Is Worth Going to the Mat for

One way to create a unique game program is to blend two dissimilar genres.



Alien wrestlers in Mondu's Fight Palace.

That's exactly what Activision has done in Mondu's Fight Palace, an appealing mixture of wrestling and science fiction.

You compete against either a human opponent or the computer, using both a joystick and the keyboard. When playing alone, you start your mat career by controlling Rex, a humanoid who's the weakest of the game's ten grapplers. His exotic colleagues include Slash, whose razor-sharp body cuts up his foes; Colonoid, an entity whose hometown is a test tube; and Mondu the Fat, the Fight Palace's owner and the reigning champion. Succeeding with Rex, you move on to higher levels where you control more powerful ring warriors.

The game places great emphasis on money, earned by winning fights and betting correctly on the length of the bouts. You can spend the cash on 19 weapons, including the Hands of Sutmar, which double your punch power for ten seconds, and the Wheel of Pain, a titanium dart that explodes on impact.

All the wrestlers, male and female, include throws, back flips and 13 other moves in their repertoires. In addition, each has a special move. Rex, for example, is noted for his high-flying "death kick" (which is actually tame compared to the bizarre maneuvers of the nonhuman grapplers).

Activision skillfully crafted almost every aspect of Mondu's Fight Palace. The graphics are detailed and colorful, the interface is user-friendly, and the control system is fluid. Also, the need to develop sound tactics for selecting weapons and betting adds mental challenge to the rough-and-tumble mat action.

The package's only major shortcoming is a chart in the manual that gives erroneous information on how a joystick affects on-screen movement. However, you'll be able to figure out what the manual should have said by experimenting a bit in two-player mode.

Activision deserves high praise: Mondu's Fight Palace is an excellent execution of an original gaming concept. *(Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$29.95)*

—WALT LATOCHA

STRIKE ACES.....D

Everything But the Action

For the elite military pilot the ultimate test of flying/fighting proficiency is SAC's Bombing and Navigation Competition. Held each year at Ellsworth Air Force Base in South Dakota, the BNC goes actual combat one better with a guarantee that you face the best pilots flying the hottest "enemy" machines. Complete all eight missions and the coveted LeMay Trophy is yours, along with recognition as the "Ace of Strike Aces."

Starting with a 43-page manual, Accolade's simulation of the event aims for nuts-and-bolts accuracy. Your aircraft choices include the U.S. F-4E Phantom and F-111F Aardvark, Britain's Tornado IDS, and even a Russian MiG-27. Fair enough, since your competition can be a MiG-29 Fulcrum, an F-14 Tomcat or an F5E Tiger II. You can arm each plane with a different mix of weapons.

Strike Aces, with practice takeoffs, bombing and landing sequences, plus disk saves for up to ten pilots, scores well on just about every fun criterion except, unfortunately, action. A cockpit crammed with slow-responding, hard-to-read instruments is your first warning. Once airborne, you see a bland "sticks and pyramids" landscape that lacks detail at lower levels. Changing your view, for example, from Cockpit to Chase Plane or Satellite hardly matters: Down is blank whiteness, and ground targets are virtually invisible ►

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up to point-blank range.

The problem is scale. If a fractal-generated landscape contains just enough information to "work" a mile up, it looks blank at 100 feet. The same goes for joystick response. High above mountain tops, you hardly notice the limited one or two updates per second, but on a ten-second, treetop-level straffing run, your killer bird responds like a dodo!

Though the lure of air-to-air combat may get you through the mandatory ground-only missions, don't count on it. Few arcading experiences are more frustrating than tackling a high-action challenge with mushy controls. Good sound and setup notwithstanding, your best Strike Aces maneuver is a fly-by. *(Accolade, 550 South Winchester Blvd., Suite 200, San Jose, CA 95128. C-64/$29.95)*

—Jeff Hurlburt

3-D Pool.....C

A New Angle on Eight Ball

Minnesota Fats and the rest of the pool hall crowd always pace around the

The table tilts in 3-D Pool eight ball.

table while lining up their shots, but in 3-D Pool you sit still while the table tilts and rotates. Eight computer players are available in case you can't find a human opponent for eight ball, the only game played in the 3-D Pool hall. Fifteen trick shots will test your skill, and you can design harder ones with the trick-shot editor.

To get a different perspective on the table, flip your view to the other side or zoom in and out. When shooting the cue ball, set the power of your stroke with the on-screen meter, then tilt the table up or down (using joystick or keyboard control) to add top- or bottom-spin.

Tournament play starts in the quarterfinals and pits you against formidable opponents. Unfortunately, there's no way to save a game in progress, unless you have Software Support International's Super Snapshot, so you probably should start a tournament when interruptions won't occur. *(MicroPlay; distributed by MicroProse Software, 180 Lakefront Drive, Hunt Valley, MD 21030. C-64/$29.95)*

—Lonnie Brown
Lakeland, FL

Rick Davis's World Trophy Soccer.....A+

Kick the Ball Around

This Nifty Field

World Trophy Soccer kicks off on a 3-D field, complete with players, soccer ball, penalty box, and more. A quick glance at the game's instructions and you're ready to start. Joystick control is slick and intuitive, but even at the first of five levels of play the computer is a formidable opponent. You may prefer to compete against a friend.

The program's graphics are impressive: lime-colored turf scrolls by as your key player moves; a shadow darts around beneath the players and ball, creating a dizzying effect; and opposing players crowd in as you jockey for a goal. Once the ball is launched, the screen switches to a close-up of the goalie. These and various other polished details blend together in this unique and exciting soccer game. *(Melbourne House; distributed by Mastertronic, 18001 Cowan, Irvine, CA 92714. C-64/$29.95)*

—John DiPrete
Cranston, RI

Centauri Alliance.....C+

Not Too Little, but

A Few Years Too Late

Take a game like the Bard's Tale, move it up a few hundred centuries into a galaxy filled with hostile aliens and you have Centauri Alliance. Your goal is to complete various short missions aimed at defeating the aliens. Up to eight party members from six races (each with its own strengths and weaknesses) can band together in the effort. Each character belongs to a discipline devoted to fighting, helping others or fixing broken equipment and artifacts. Your mission spans a dozen planets, with combat taking place on a hexagonal grid.

Alliance characters can be created

Characters join forces in Centauri Alliance.

from scratch or transferred from Wizardry, Ultima, Bard's Tale or Might and Magic. In the transfer, characters are processed a bit to meet Alliance's requirements and some magical items may be lost.

Two views are available: 3-D first-person and overhead. An automapper displays all areas your party has visited, although the maps aren't saved when you leave the adventure.

Three years ago I would have applauded Centauri Alliance, but in 1991 it comes across as a rehash of old ideas. Also, the graphics are bland, and disk access is frequent and slow. This program is big, polished, fun and easy to learn but was released too late. *(Broderbund, 17 Paul Drive, San Rafael, CA 94903. C-64/$29.95)*

—John Ryan

Secret of the Silver Blades.....C+

This D & D Falls Just Short

Of Other SSI Adventures

Third in SSI's Forgotten Realms saga, Secret of the Silver Blades sends your stalwart band against the Black Circle and other minions of the Dreadlord. The Dreadlord, his fortress in the mines of the town of Verdigris, has been frozen in a magical glacier, which BC mages are now melting! You must uncover the Dreadlord's secret weakness and rescue the town before it's too late.

As in earlier installments, you'll find 3-D forward views in mines and dungeons, plus colorful pictures of guardsmen, monsters, and the like. Tactical combat is handled through the same scrolling display, and SSI's interface delivers convenient control of each member. New wrinkles include teleportation between sites, a town vault that accepts both items and money for storage, resurrection,

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training services and free healing.

A built-in fast-loader produces a smooth-running adventure. Regrettably, the adventure is where Silver Blades fumbles. Whether imported from Azure Bonds or newly created, your six heroes are so powerful only two or three battles pose a real challenge. The game's six disk sides, Rule Book, Journal and Clue Book (purchased separately for $12.95) deliver half the play, challenge and scenario content of earlier D & D efforts. *(Strategic Simulations, Inc.; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95)*

—JEFF HURLBURT

CASTLEVANIA ..... B

Grisly but Enjoyable

Action Beckons You

Count Dracula lurks in his castle, and you must thread its labyrinth of chambers to find and destroy him. He's protected by an assortment of gothic creatures, from an Axe-Man to zombies, which you must confront.

Using your joystick, you can move in eight directions, climb stairs, jump, crouch and turn. Pressing the firebutton activates the magical items and weapons you find or win along the way. Your favorite weapon is a cracking whip that must be flicked with perfect timing. When you destroy a creature, it leaves behind its heart, a gruesome booty that will empower your stolen weapons. On-screen indicators display your power levels, remaining lives and time, and the number of hearts you've found.

Castlevania includes various scenarios, although I didn't find a significant difference between them. A special program option lets you save and restore a game over and over. Good graphics and animation, adequate music and sound effects, and a nifty—if clichéd—plot make Castlevania a game of chills and thrills. *(Konami, 900 Deerfield Parkway, Buffalo Grove, IL 60089. C-64/$39.95)*

—JOHN DIPRETE

COMBOTS C

Robots Play a Deadly Game

Of Hide and Seek

The year is 2006 and the world has been overrun by alien robots. Earth's

Strategy keeps you on the map in Combots.

only hope against these overwhelming machines is its own human-operated robots. The hunt and battle take place in the four scenarios of Combots, a one- or two-player game of strategy and tactical combat.

Each robot, or combot, is equipped with various power sources, weapons, sensors, force fields and levels of armor. The game, played on a hexagonal map, consists of a series of turns in which you issue movement and fire orders to your machine. Play continues until your mission is complete or your combot is destroyed.

Strategists may find Combots intriguing, but the time needed to learn the game, along with its lack of animated combat sequences, decent sound effects and spicy graphics, make this cyborg-versus-cyborg contest rather dull. *(Avalon Hill Game Company, 4517 Harford Road, Baltimore, MD 21214. C-64/$24.95)*

—JOHN RYAN

DRAGON WARS ..... A

This Game Breathes Fire

With the release of Dragon Wars, a traditional role-playing game set in the watery world of Oceana, Interplay has returned to its roots. The result is a game that outshines even their popular Bard's Tale series produced for Electronic Arts.

One of the most obvious improvements is seen in Dragon Wars' graphics. The window on your characters' world is almost four times larger than in Bard's Tale III. The text window is at the bottom of the screen and numbers describing character attributes have been replaced by color-coded bar graphs. Another improvement is the powerful automapping feature, which provides a detailed, full-screen overhead view of the area surrounding your characters.

You begin play with four characters and can add up to three nonplayer ►

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characters along the way. If you don't care for the party that comes on the disk, create your own or transfer characters from Bard's Tale. Besides the usual traits, Dragon Wars characters boast various practical skills. Using a wide variety of weapons, plus five categories of magic and more than 60 spells, adds to their experience. Naturally, there's an equally wide array of monsters to battle. All are carefully drawn and animated. *(Interplay, 1575 Corporate Drive, Costa Mesa, CA 92626. C-64/$44.95)*

—Bob Guerra
Charlestown, MA

Find and destroy the dragon in Spherical.

Spherical .....B–

100 Levels of Puzzle-Solving Excitement

In Spherical, you must guide the Starball through 100 rooms of a dragon's castle until you reach the owner and destroy him. Each room offers obstacles to overcome, such as monsters, and valuables to collect, including objects that make you invulnerable.

The best strategy is to build steps to get to the Starball, then place a block in front of the ball to keep it from moving. With the ball restrained, you have the leisure to construct your path. You get four chances before you must go back to the first level.

Spherical's music and graphics are first-rate. Each screen is packed with colorfully drawn moving and static figures. Occasionally, items are difficult to recognize, but after a few viewings, everything is easily identifiable.

A save-game feature would have made this very difficult program more accessible to novices and intermediate adventurers. Without it, many players will give up long before reaching the last screen. *(Rainbow Arts, 3413-A Benson Ave., Baltimore, MD 21227. C-64/$24.95)*

—Len Poggiali
Syracuse, NY

Ferrari Formula One .....B –

You Win Some, You Lose Some

Electronic Arts' Ferrari Formula One is really two racing simulations in one. It's a complex strategic simulation of a full season of championship racing on 16 international Grand Prix courses, and an arcade-style driving simulation that puts you in the seat of a $350,000 Ferrari.

The program receives high marks for technical accuracy. Before entering a race or taking your car to the track, you can adjust tires, engine, suspension and gear ratios in the garage, and the car's

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"wings" in the wind tunnel. Last minute adjustments are possible in the pit.

The realism extends to the sequence of events in each race and the racing season in general. As you race, a digital clock shows the time and date. Time for travel between tracks is figured into the simulation, as is time for recuperating from injuries.

Despite the realism, the driving action leaves a lot to be desired. The graphics are unimpressive, the joystick unresponsive and the animation agonizingly slow. The only way to speed things up is by blacking out the map and race information at the top of the screen—and that works only on a C-128 in 64 mode. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95)*

—Bob Guerra

STARFLIGHT.....B

The Fourth Time It Was Great

The third time Starflight glitched, I was not amused. After all, it takes time and money to equip and staff a starship! But when I booted the program the fourth time, I found my cargo bay 1315 percent full of gold and valuable Endurium (fuel). So, instead of the standard Endurium-guzzling boltbucket, I bought a heavy-duty cruiser with laser cannons and a skilled crew. The program hasn't crashed since, and I've been the master of the universe.

It's a big universe, with 270 star systems and 800 planets. The object is to collect minerals and artifacts in other solar systems and then cash them in to purchase crew training and more powerful cruisers. While exploring planets in your terrain vehicle, you must face alien attacks, and wind and electrical storms, and it's easy to run out of energy far from the spaceship. Since exploring even the closest solar system can take 20 minutes, there's a lot of gaming on this two-sided disk. Fortunately, games can be saved. A clue book, which I consider a necessity, is available for an extra $12.95.

Starflight's graphics are good, but a bit limited, a trade-off for packing so much into the program. Copy protection—a two-layered "security code" wheel used each time you leave Arth—gets old quickly. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95. Clue book $12.95)*

—Lonnie Brown ■

Answers to the* RUN *Crossword Puzzle from page 55.

ACROSS

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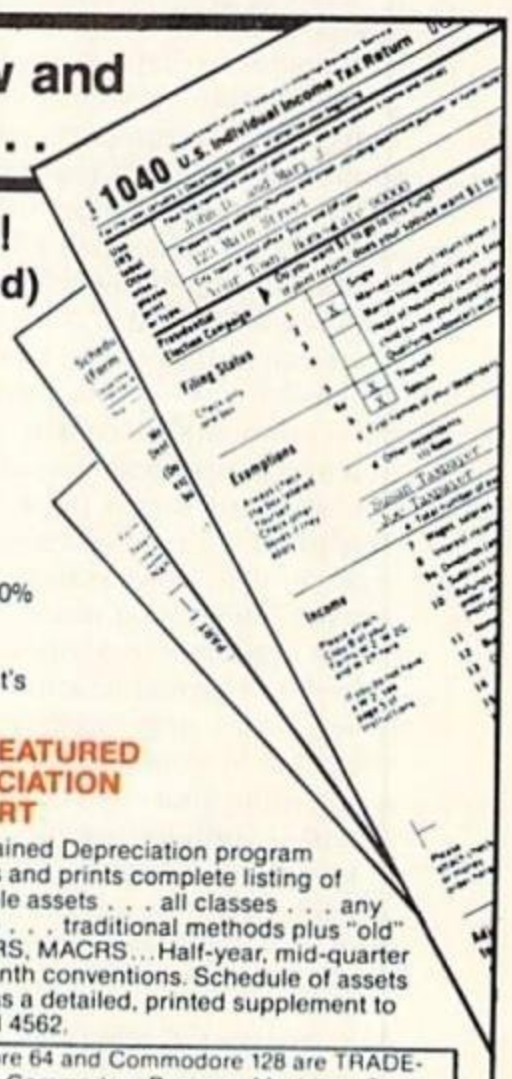

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Commodore Connection

Pass the word! You can discover a world of services, fun, information and software without busting your budget.

By TIM WALSH

Many people use their computers for years without ever experiencing the excitement and convenience of telecommunications. Commodore computerists are no exception. As a long-time advocate for telecommunications, I've convinced others time and time again that a modem and a telephone line are the two best vehicles for exploring vast new avenues with their computers.

To define telecommunications as it applies to home computers, it's little more than connecting a modem to a computer so that it can communicate with other computers. Despite its simplicity, however, telecommunications gives your computing life a real boost. As the Commodore 64 and 128 reach senior citizen discount age, telecommunications can play a crucial role in making the most of the "golden years."

The above-mentioned modem (MOdulator/DEModulator) is a device that converts a computer's data to and from signals that can be transmitted via a cable or telephone line. Along with a modem, software is also needed—commonly referred to as either a terminal program or a telecommunications package—that will allow you to convert and direct data to and from the modem. Equipped with these essentials, your Commodore is ready to share data with other computers and transport you into an exciting new world.

The argument most often heard against becoming involved in telecommunications is that it's too complicated to learn and, once mastered, is too costly to use. We'll show that by employing a little ingenuity and common sense, using your computer with an existing phone line is neither complex nor costly. Unlike some other aspects of using your Commodore, such as the waning software market, telecommunications continues to grow at a swift pace, with more and more computerists discovering the experience for the first time.

Making the Connection

Using a modem and a terminal program, you can use your Commodore to transmit text files to and from other types of computers. When you consider the fact that your word processing files can be shared by computers such as Amigas, MS-DOS machines and Macintoshes, the possibilities are endless.

Another compelling reason to consider exploring telecommunications is to quench your thirst for computer knowledge. Rather than lament your inability to find fellow Commodore enthusiasts or nearby user's groups to broaden your knowledge, telecommunications allows you to establish contact with other computerists from around the block—or around the world!

Another benefit of telecommunications is the opportunity that it offers to computerists to obtain "freely distributable" software. Unlike commercial software, freely distributable software consists of useful and entertaining public domain files, which are free, and shareware programs, where the author asks for a donation for using his or her program. Freely distributable files can legally be passed along to other computerists at little or no cost. Without a modem, most computerists have minimal or no access to this type of software.

A unique social element also accompanies telecommunications. For instance, joining a bulletin board system (BBS) not only allows you access to files, but also lets you exchange electronic mail (e-mail) with fellow computerists. More often than not, you'll find that having access to a fairly active BBS will not only make your library of software grow, but also make the time you spend with your computer a more gratifying experience.

Going a step beyond the bulletin board, there are telecommunications networks. Imagine a large-scale BBS with many users sharing the lines simultaneously and you've got a pretty accurate picture of the typical network. Not only do these networks offer efficiency and huge libraries of files, but also many social services. Through the networks, shopping, banking and educational opportunities are available without leaving the comforts of home.

Most major telecommunications networks also offer up-to-the-minute news and financial reports from Wall Street, so small-scale investors can use their computers to help make timely investment decisions. In addition, networks offer forums on subjects ranging from self-improvement to discovering the latest developments in computer technology. Networks can quickly become an integral part of your computing experience.

In this survey, we'll start off with a look at modems, followed by a discussion of what you should look for in terminal software. Along with an examination of the advantages of bulletin board systems and telecommunica- ►

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tions networks, we'll also discuss ways to save money while staying online.

Getting Started—Get a Modem

When you're ready to try your hand at telecommunications, you first need a modem. The best advice that I can offer any budding telecommunications computerist is that "faster is better." A 1200 baud (1200 bits per second) modem is better than a 300 baud modem, while a 2400 baud modem is superior to a 1200. The faster the modem, the *less time* you'll spend online, and the less time you spend online translates into direct savings.

A satisfying trend that Commodore computerists have benefited from for the last few years is a steady reduction in the price of external modems. With internal modems becoming more popular among the users of PC compatibles, the prices of external modems have been falling. Modems that once cost over $200 can, in some cases, now be found for under $100.

When you get an external modem, you need a special cable in order to connect it to your computer (see "Tools of the Trade" below). If you can find a 1200 or 2400 baud

Tools of the Trade

By JOHN RYAN

THE DECISIONS FACING YOU as you enter the world of telecommunications can seem about as difficult as those faced when you bought your first computer. "What model is the best for my needs? Is a 300 baud modem really cost effective? Do I need a 2400 baud modem—does my C-64 even support 2400 baud?"

The answers to these questions really depend on how far your budget can stretch. If your interest in going online is casual, a minimal setup may be what you need. If you plan on doing serious work online, however, you may have to spend a bit more. Let's take a look at some alternatives facing both those on a limited budget and those with a bit of financial flexibility.

Dial M for Modems

A modem is the biggest single hardware investment you'll make for telecommunicating, so it is essential that the one you purchase is reliable, offers manufacturer support and has features considered industry standard, for example, auto-answering, automatic dial, pulse and tone dial.

The cheapest modem available is the Commodore 1660 direct-connect modem. (*Direct-connect* means that the modem is inserted directly into the user port at the back of the computer, whereas an *external* modem is one that is connected to the computer with a separate cable.) A 1660 offers the minimum features you'll need to get started and you can get one for $10 from *RUN*. There is a down side to the 1660 however: it only communicates at 300 baud. This slow transmission rate is fine for accessing local bulletin boards, but can be very costly when accessing national networks such as GEnie, PeopleLink, Q-Link and CompuServe. As you well know, long distance phone costs mount up in a hurry.

Probably the most widely used modem today among Commodore owners is the CBM 1670, a 1200 baud direct-connect modem. This modem is very reliable, offers auto-answer/dial and is relatively cheap ($24.95, also from *RUN*). The down side to this modem is that even at 1200 baud, downloading large files from commercial networks can wipe out your spare change by the end of the month. Even so, a 1670 is the way to go for those with limited budgets, or for passionate Q-Linker's who are tired of 300 baud access.

Hayes Compatibility

You are not, however, cursed to remain limited to 1200 baud with your trusty C-64. A *Hayes-compatible* modem is the perfect choice, especially if you have plans to upgrade to another computer someday. (The 1660 and 1670 mentioned above are Commodore-specific.) 2400 baud modems are becoming increasingly popular and many people are avidly moving up into the realm of high-speed communications. To do this, you will need a modem that is capable of 2400 baud access, and you will also need an RS-232 interface to connect the modem to your computer.

Most 2400 modems are external modems. Aprotek, however, manufactures a direct-connect 2400 baud modem, the Minimodem-C24, which is available for about $80 through mail-order companies that advertise in *RUN*. It is both Hayes-compatible and 1670-compatible. The Minimodem sports handy status indicators, including busy detect, high speed detect (2400) and, of course, auto answer/detect, tone and pulse dial.

One of the best external 2400 baud modems available today is the Supramodem 2400. The Supra is an intelligent, versatile modem that is compatible with the industry standard "AT" command set (Hayes-compatible). It supports 300, 600, 1200 and 2400 baud and features volatile memory that stores a telephone number and custom configuration profile. Mail-order companies sell the Supramodem for about $100.

In line with the Supramodem, the Cardinal and Evercom modems offer similar capabilities for about the same price, though without the internal programmable features that are the hallmark of the Supra.

If you buy an external modem, you're faced with the problem of how to connect it to your Commodore. The easiest way to connect an external modem to your user port is via an RS-232 interface and an RS-232 cable. Aprotek sells what it calls the Universal RS-232 interface that accomplishes the task nicely. The URS-232 has three configuration switches to allow connection to virtually any serial device.

On the other hand, Dr. Evil Labs has developed Swiftlink-232. Swiftlink not only allows for asynchronous communication with external modems (via a standard DB-9 female to DB-25 male modem cable), it also permits your Commodore computer to communicate in baud rates from 300 to 38,400! Swiftlink comes in the form of a cartridge with a built-in RS-232 connection. It costs $29.95 and comes with a terminal program that supports geoTerm, G-Net and Color64 BBSs.

Do It Yourselfers

If you are the enterprising type, you can build your own RS-232 interface. For less than $20, with a little sweat, and parts from your local Radio Shack store, high-speed telecommunications can be yours. Besides a serial cable, you'll need to locate a 12/24 pin connector with .156 lead spacing. You'll also need a DB-25 female circuit board connector, either soldered or wire-wrap. Table 1 contains a list of Radio Shack parts you'll need. You can find diagrams to build this interface on Q-Link in the software library under Telecommunications (files are located in the Miscellaneous and Articles headings).

Terminal Choices

Chances are, if you purchased either the Commodore 1660 or 1670 modems, one of the first software files you will download is a terminal program—the software that operates your modem. Unfortunately, the Common Sense terminal program included with the 1660 and 1670 is unwieldy and hard to use. Fortunately, there are viable alternatives, both commercial and from the public domain. Let's see what you need to look for in a good terminal program.

Any terminal program should be easy to

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modem at a reasonable price, be sure that it is a *Hayes-compatible* modem. This standard ensures that it'll work not only with your computer, but also with most of the telecommunications software that you're likely to use with your Commodore.

Terminal Programs

Whether you're using a Commodore 64 or 128, you will need to get a program to use with your new modem. Plenty of good terminal programs exist for both computers. Knowing what to look for in a terminal program makes the decision process easy. And remember, there's no need to limit yourself to just one program.

What's important when making the decision? Three fundamentals are apparent. First, don't bother to buy an expensive, option-laden package if a low-cost shareware or no-cost public domain alternative will do. A second consideration is to make certain your software is compatible with your hardware. For instance, if you get a 2400 baud modem, make certain your terminal program offers 2400 baud support. Finally, if you a use a C-128, get a C-128 compatible program rather than one that forces ►

use and as intuitive as possible. This means plenty of pull-down menus and pop-up windows, as well as those options considered standard for terminal programs, including auto-dial, a phone directory, capture buffers, and protocols including Xmodem, Punter and CompuServeB. (A protocol is nothing more than the method by which the terminal program communicates with the host BBS.) Script support is also important, for it can virtually automate much of your log-on process.

Good commercial programs are available today that contain most, if not all, of these features. A cheaper alternative worth considering, however, may be to download a quality terminal program from a BBS or national network. Let's explore both options.

Store-bought Options

On the commercial side, C-64 owners might be pleased to learn of a new terminal program named BellTerm C-64, written by Ed Bell. BellTerm C-64 redefines the term "full-featured," offering a combination of functions such as using REUs as RAM drives and providing an 80-column mode. Other features include compatibility up to 19,200 baud with Swiftlink-232, and standard 300/1200/2400 baud support. Also setting it apart is a new Hi-res mode that allows for the display and printing of Koala, RLE, Doodle! and Print Shop graphics. File transfer protocols include X-Modem CRC or Checksum, 1K X-Modem and Y-Modem. You can also save up to 50 entries in the built-in phone book, and unarcing capabilities during and after downloads. BellTerm C-64 is available from Parsec, Inc., PO Box 111, Salem, MA 01970, for $29.95.

128 fans might want to consider Dialogue 128. Like BellTerm 64, it supports REUs and all disk drives, but also goes a bit further and supports the C-128's native mode for fast disk access times. Protocols served by Dialogue 128 include the usual X- and Y-modems, CompuServe B and Punter C1. Buffer-wise, it can't be beat. It has a 64K character capture buffer (512K with 1750 REU), up to eight separate capture buffers, and a full-featured text editor. Dialogue 128 also offers you a choice of input via keyboard, mouse, joystick or trackball. An auto-execute script language is also included. Transfer rates offered include 300, 1200 and 2400 baud. It is available from Shining Star Software, #1205-1640 Bayview Ave., Toronto, ON, Canada M4G 4E9 for $49.95 U.S., $59.95 Canadian.

Public Domain Alternatives

Since most manufacturers include some type of terminal program with their modems (usually of suspect quality), you can log onto a network or local BBS and try out several public domain terminal programs available there. Some of them are as good as or better than their commercial counterparts.

Novaterm 64, supported by Dr. Evil Labs, is a full-featured, easy-to-use program that has some outstanding features, foremost among them is built-in support for Swiftlink-232. You'll also find 80-column ANSI color graphics support, error-free 2400 baud operation, REU (RAMdisk) support, and a wide array of protocols, including Xmodem, Punter, Ymodem-batch and Multi-Punter. With a simple menu structure that contains an array of outstanding options, Novaterm is an exceptional program that is sure to meet any need. You can find Novaterm on Q-link (filename "NOVA9.1-1.SDA").

Another good terminal program also found on Q-Link is Eliteterm (filename "ELITETRM.LNX"). Eliteterm also supports 2400 baud operations and its protocol support is as varied as Novaterm's. A lot of functions are packed into this program, ranging from built-in phone books to Amiga-style pull-down menus and DOS Wedge commands.

128 owners need not feel left out, for there are several good 128-mode terminal programs available. A good one to consider is Deskterm V2.0. This program is absolutely stuffed with high-end options not even found in most commercial terminal programs. You can use an REU for high-speed RAMdisk operations or rely on Deskterm's support for your 1581/71/41 disk drive. It works with any Hayes-compatible or 1670-compatible modem and offers many excellent features such as script support, ANSI color graphics, automatic buffer saves, easy-to-use menus, and just about any protocol you'll ever need. As with the other terminal programs previously covered, DeskTerm can be found on Q-Link in the C-128 telecommunications library.

Final Communication

Before you download a terminal program, keep in mind a few important points. Many of these programs require that you also download ancillary or support files for the main program, so *read the author's notes at the beginning of the file description*. Make sure you're downloading all of the files required. This holds especially true for terminal programs that are Hayes-compatible. Also make sure that you have the necessary software to "uncrunch" the program, such as LYNX, Unarc, or Omega-Q (Q-Link). ■

Table 1. Radio Shack parts needed to build your own RS-232 interface.

Number	Description	Part Number
1	7404	276-1802
1	75188 or MC1488	276-2520
1	75189 or MC1489	276-2521
3	1N4001 diodes	276-1101
1	circuit board	276-1543
3	47uf, 16v capacitors	272-1027
1	10Ouf, 16V capacitors	272-1025
4	10Kohm .25w resistors	271-1335

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you to stay in 64 mode. With the C-128 terminal program, you'll be able to take advantage of the computer's 80-column screen, Fast mode and the quick access times of the 1571 and 1581 disk drives.

Terminal programs will introduce you to a few terms unique to telecommunications, such as *file transfer protocols*, *word lengths*, *duplexes* and *stop bits*. It's not essential that you learn the meanings of these terms, just that you know how to adjust (configure) these settings with your software. The secret to making a connection to another computer is usually a matter of calling the BBS or network in question by voice first and finding out exactly how to configure your software for a proper connection.

In most cases, the system operator ("sysop") or a representative from the network will tell you how to set the protocols. If you can't see what you type on the screen after connecting, switch to half duplex if you connected at full duplex. Similarly, if a bad connection occurs or certain options don't work, try changing each of the settings and making a note of the change so that you can configure the software for making a flawless connection every time.

One of the most confusing topics of telecommunications is the file transfer protocols. There's X, Y and Z-modem settings within most packages, and some even offer a Punter file transfer protocol. It's important to note that in most cases, the file transfer protocol has no effect on the operation of the terminal package *until it's time to either send or receive files* from within the program. Again, the method used depends on what is supported by the computer that you're telecommunicating with, or what the sysop or network rep recommends. A good rule of thumb is to stick with whatever transfer protocol works best for you through trial and error.

Two of my personal favorite terminal programs for the 64 and 128 hail from *RUN*. RUN Term 64/128, found on RUN Works and the Super Starter Pak, is an excellent program, with features for sending and receiving files in any number of formats. It offers provisions for customizing and saving the screen and settings, provides a helpful menu at the press of a key, and can save a phone book of names and numbers.

The second in my list of favorite terminal programs, geoTerm II, is a terminal program that operates in the GEOS environment. While it offers a host of features, such as a phone book and a choice of 300 or 1200 baud rates, its most useful feature is often overlooked. I use geoTerm II for its ability to convert GEOS files to Commodore format and vice-versa. GEOS users find this feature the one that makes geoTerm II such an indispensable file in their software library.

Watching Expenses

All too often, magazine articles tout the virtues of modems and their related software without addressing the accompanying costs associated with telecommunications. While no faster, more efficient way exists to transmit or receive files than by using a modem, costs are incurred through long distance charges. Another big mistake that newcomers make when beginning their journey into the world of telecommunications is forgetting to keep tabs on expenses incurred through network usage charges. Between on-line connect times and long distance service charges, it doesn't take long to ring up huge bills.

Here are some quick tips to keep the costs down:

1. Try to call only those BBSs that are within your local area to avoid long distance telephone charges. If you must call long distance to a BBS, call when rates are lowest. With most long distance telephone companies, rates are at their lowest after 11 PM and on weekends.

2. Find a local Tymnet number for accessing the networks. (Tymnet is a service that makes long distance numbers available locally. Look for it in your phone directory.) Since many computerists live outside of large metropolitan areas, it's not always easy to find a telephone number ►

The Wizard of GEnie

By GERRY DESCOTEAUX

WELL, HE'S DONE IT AGAIN. Programmer Bill Coleman has made my life easier. And, if you're a C-64/128 GEnie subscriber, he's done you a favor, too.

After joining GEnie and spending a number of frustrating sessions with it, I remembered hearing over on "cyberspace" neighbor Q-Link about The Wizard, a terminal program designed especially for the C-64. I made my way to GEnie's Commodore Flagship Area libraries, found The Wizard and managed to download it. Since then, it has brought GEnie out of the bottle for me.

The Wizard lets you take advantage of the 1351 mouse for accessing its roll-down menus, which lead to every conceivable function of this gargantuan system. Also, the program's built-in luxuries lessen any concern about remembering page numbers and three-letter command prompts, so you're free to explore and truly enjoy GEnie.

There are four separate but interacting modes in Wizard 64. One is a standard terminal mode that works like any other terminal program. Once you've set the parameters to your liking, you'll never again have to dial or log onto Genie manually. Using your mouse, you can not only tell The Wizard where you want to end up in GEnie, but what colors you'd like in your screen display.

The other modes are also entered automatically, but manual selection is possible using the icon totem pole. The Live-Wire (for chatting) and Real-Time Conference modes include various icon-selected options. The Bulletin Board mode provides access to GEnie's myriad bulletin board (BB) sections, the majority of which are now part of Star Services. This means that you can trade information, ideas and opinions with people of similar interests everywhere for less than $5 a month.

When you download The Wizard, it comes with an ASCII documentation file that's extensive and informative.

I have found a couple of glitches in the program. First, the preset menu options do not accommodate the new four-digit page numbers used in Star Services. Currently, these user-definable options allow only three-digit page numbers. The only other problem I found was a shortening of the text view area after a menu has appeared. The documentation does offer a remedy for this, however: Clicking between menus clears the screen and allows the standard full-page scroll.

All in all, I give The Wizard an A+. If you access GEnie without it, you're missing a great mind-easer and time-saver! So link up, sign on and download. ■

Gerry Descoteaux lives in southern New Hampshire and uses his C-64 to publish a monthly music magazine.

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that doesn't carry long distance connect charges. Sometimes a local number comes into service, but is not published. If you have to call a long distance number to connect, ask your network(s) on a regular basis if new numbers are available.

3. Always call the networks when rates are lower, during prime-time hours (usually 6 PM to 7 AM). Daytime calls can run as high as $18 per hour or more, *not including* any long distance charges.

4. Upgrade to a 2400 baud modem, since it'll pay for itself by reducing the amount of time you spend on the networks and BBSs. While some networks charge more by the hour for 2400 baud than 1200 baud, you still save money by spending less time downloading and uploading files.

5. If you're already using a 2400 baud modem, make sure that the software you're using is set at 2400 baud! Often, I've seen computer users who've equipped their machines with 2400 baud modems but are unknowingly still using them at 1200 baud.

The Networks

Commodore users are fortunate to have ready access to major computer networks. Four of the more popular ones are QuantumLink, GEnie, CompuServe and PeopleLink. Let's take a look at each.

● ***QuantumLink***: Unquestionably the most popular among Commodore computerists, QuantumLink, or Q-Link as it is commonly called, differs from other online services in a variety of ways. Most notably, you can forget about using your favorite telecommunications package with QuantumLink—custom software is necessary in order to access this network. Second, since custom software is used, you get the most intuitive user interface to be found on any of the networks.

The required system software that makes Q-Link easy to use also hinders its flexibility. Accessing other networks can be done with your favorite terminal package, which allows you to view disk directories, issue disk commands and adjust terminal settings. In other words, you generally have lots of control over your computer. With the Q-Link system software, you can still access your disk drive, but only at certain menu prompts. Also, a special software patch is needed in order to use a 1581 disk drive. Add to that the fact that Q-Link system software only works in 64 mode and it becomes clear why experienced users long to see improvements.

Q-Link's inherent ease of use and busy activities compensate for functional deficiencies in the system software. Large software libraries, plenty of activity, special festivities and nightly special-interest forums make Q-Link an exciting adventure in computing. Seasoned sysops who are willing to help and provide their expertise can be found in many areas.

For more information, call 1-800/392-8200.

● ***GEnie***: Besides offering a large collection of freely distributable software for your Commodore, GEnie also boasts some of the lowest rates in the industry. For a mere $4.95 monthly subscription fee, you have unlimited access to GEnie's Star Services, and a monthly issue of *LiveWire* magazine. The Star Services let you read the news, find out about the latest activities on GEnie, and access about 100 services.

Unlike QuantumLink, you don't need custom system software in order to access GEnie. Not only does this leave you in complete control of your computer, but you can also venture into other areas of GEnie, such as the MS-DOS and Amiga areas—something that you can't do with the QuantumLink software.

GEnie is packed with files for both the 64 and 128. As recently as November 1990, over 40 new files for the Commodore 8-bits were added to the already well-stocked libraries. If you'd rather shop than download files, get out your plastic, because GEnie offers a smorgasbord of shopping options.

One of my favorite functions of GEnie is the abundance and flexibility of menu options. The syntax used in the e-mail area and its screen editor is a bit trickier to learn than, for instance, CompuServe, but it offers unparalleled flexibility. Bill Coleman has recently written Wizard software for both the 64 and 128 (see previous page) that cures the ills of the standard screen editor.

For more information, call 1-800/638-9636.

● ***CompuServe***: Like GEnie, CompuServe is a large scale telecommunications network with thousands of subscribers. As with GEnie, special system software is not needed to access CompuServe. You can use your favorite commercial or public domain terminal program to connect to the system.

A wide variety of 64/128 software is available on CompuServe. You can download many files, check the regularly updated news as it happens, attend forums and generally have a good time. As with GEnie, if you like to shop online, you certainly won't be disappointed with CompuServe.

A subscription to CompuServe also gets you a subscription to *CompuServe* Magazine, a publication nearly the size of *RUN* (64 pages in the December 1990 issue). The magazine makes for leisurely reading and proves to be an invaluable guide for finding obscure but helpful files. The Commodore 64/128 may not always be mentioned in the magazine, but the area is always active.

Probably the best thing about CompuServe is that no matter when you log on, there are always other folks online wanting to chat and provide assistance.

For more information, call 1-800/848-8199.

● ***PeopleLink***: While its official name is American People/Link, it's affectionally referred to as PLink. This busy network offers an abundance of Commodore 8-bit files, as well as a second-to-none selection of Amiga files. Also, like GEnie and CompuServe, no special system software is necessary for accessing it.

While it's similar in operation to CompuServe, using much the same syntax for commands, it lacks some of the features that you'll find in the large networks. There's nary a trace of non-computer information—no news, no stock prices quoted, no weather reports. While some might view this as a limitation, many "PLinkers" consider it a benefit because it's designed to be used as a reliable, timely source of the latest in freely distributable software. They want to access PLink for the files it has to offer, not to buy products or read the news.

For more information, call 1-800/524-0100.

A universe of software, services and information is available to C-64/128 users, and it's only as far away as your phone. With a few proper tools, and without killing your piggy bank, you can dial up possibilities far more exciting than you may have imagined.■

When Tim Walsh isn't busy logging in time online, he serves as RUN*'s Technical Manager.*

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Boosting Basic

Six easy-to-use machine language routines that will give your Basic programs a shot in the arm.

By STEPHEN DIRSCHAUER

Basic 2.0 is a good programming language, easy to use and adequate for most tasks. However, when you need extra speed and power, it's great to be able to call up the heavy artillery—machine language.

Even if you don't know how to program in machine language (and don't care to learn), read on. This article provides six short, painless routines that can greatly enhance your Basic programs. They will, among other things, allow you to display 16 sprites, and add an automatic help screen and a pause/continue key to Basic.

1. Memory Mastery

Memory Search & Replace, in Listing 1, when activated, searches through memory to find occurrences of a given byte and replaces them with another. The syntax is simple:

SYS 50555,START ADDRESS,END OF ADDRESS+1, SEARCH BYTE,REPLACEMENT BYTE

For instance, if you wanted to search from location 49152 to 50000, replacing all appearances of 0 with 255, you would enter SYS 50555,49152,50001,0,255. (Note that the second parameter is the last address plus one. So you use 50001 and not 50000.)

This routine has special uses, but its real strength lies in its power to do character animation. By searching through screen memory (where your C-64 keeps track of its text display) from 1024 to 2023, you can exchange groups of characters at great speed. If you've redefined the default character set, you can achieve impressive results. Just remember to search for the characters' screen codes, and not their PETSCII codes. Check your C-64 owner's manual for a list of both.

Listing 1 is a Basic loader that pokes Memory Search & Replace into memory. You can include it in your own programs as a subroutine. (The Rem statements at each line's end are the checksums for *RUN*'s Checksum program found on page 60, which you should use when typing in all six listings.)

2. Help Available

Many commercial programs tout the instant help screens they make available to perplexed users. Help screens are a fantastic idea, but difficult to implement. If you want the help screen to be available all the time, it's necessary for the computer to constantly check the keyboard (never mind the hassle of putting up the screen and restoring the old display), thereby slowing down your program. However, there is an easier way, using Listing 2, Instant Aid.

Through the interrupt request (IRQ) vector, Instant Aid provides a key-activated help screen that's always available. Once the machine language part has been loaded and activated, you don't have to do a thing. What's more, installing it takes only two steps.

First, create your help screen using Print statements. Instant Aid recognizes the help screen's default starting address of 12288 by using POKE 648,48. Any and all characters are available for the help screen, however color is not. When you've finished creating your help screen, restore the Print statement with POKE 648,4 and a Print command. You shouldn't see anything happen, because while you created the help screen, the old display was preserved.

The second step is to activate the machine language routine with SYS 50618. Press the F7 key at any time to view the screen and any other key to exit.

I use Instant Aid during programming to keep a copy of the current disk's directory handy. To use it, switch the Print command (POKE 648,48), get a list of files on the disk and reset the Print command (POKE 648,4: PRINT). This can save time when checking for filenames.

3. Sequential Scanner

Reading text files from disk in Basic is possible, but it's also painfully slow. So slow, in fact, that you'll probably want to do it in machine language. Sequential Scanner, in Listing 3, not only reads the files, but waits for a key press after every page of information.

Before you can activate Sequential Scanner, you must open the file using channel 1. For example:

OPEN 1,8,2,"0:PROGRAM.DOCS,M,R"

The M after the filename tells Commodore DOS to ignore the filetype and open the file, whether it's program, sequential or user. Now activate the machine language reader with SYS50682, {number of lines}.

The lines parameter is the vertical size of the screen. Most of the time you'll probably use the default screen size of 25 lines, but anything from 0 to 255 is acceptable. An interesting value is 1, which makes you stop after every line when reading. (A line of text is considered a group of characters followed by a carriage return.) You can then press a repeating key (such as the space bar) to keep the display going. Pressing run/stop at any time aborts Sequential Scanner.

4. Directory Display

You can also display a disk directory in Basic, but once again, it's too sluggish. Still, if your program asks for filenames at all, a directory listing is a must. Display Directory, in Listing 4, prints a list of centered filenames from disk, discarding the seldom-used (from within a program, at least) file size and type. As with Sequential Scanner, open a file to read the di- ►

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rectory. You can then SYS 50764 to read the file. Finally, don't forget to close the file when you're done. For example:

```
OPEN1,8,0,"$":SYS50764:CLOSE1
```

You can use Commodore DOS wildcards for selective lists of files, as shown in Table 1. Pressing the Run/Stop key will halt the display. To pause the directory, just hit any other key. Hitting an additional key will make it continue.

5. Freeze Key

The Display Directory routine pauses with the press of a key, but what about the rest of your program? If you need to print a great deal of information at one time, an option to pause output is essential. However, as with the help screen, it's impractical to check the keyboard at every chance. Freeze Key, in Listing 5, uses the IRQ vector to add an automatic pause key to your C-64. Again, once it's installed and activated, you don't have to do a thing. SYS 50960 will make the routine work behind the scenes. When the Control and P keys are pressed, everything will freeze and the border color will change. Press another key to continue.

6. Seeing Things?

Sprites are undoubtedly the best feature of the VIC-II graphics chip. The only problem is the limit of eight. However, Double Display, found in Listing 6, doubles the number of available sprites from eight to 16. Just call up the Double Display routine at the beginning of your program with SYS 51018,split point.

Though Double Display does give you 16 sprites, each with individual characteristics, there's a catch: The screen is split in two, with eight of the sprites in the first portion and eight in the second. It may be helpful to think of the two halves as different screens. Fortunately, you decide where to split the screen. Set the split point to anything from 0 to 255. For a split point in the middle of the screen, use 150 (the first visible screen line is number 49).

You'll have to use new sprite registers, since the old ones can only handle eight sprites. Just keep in mind the limit: Sprites can't escape their respective subscreens. In fact, they should stay at least ten pixels away from the borderline separating the two.

See Table 2 for more detailed information. All Double Display registers emulate the old VIC-II sprite registers, so the same values must be supplied for twin sprites. For example, to turn on sprite 1 and position it at 65,70, enter:

```
POKE 51273,1:POKE 51248,65:POKE
  51249,70
```

To turn on sprite 10 and place it at 175,100, enter:

```
POKE 51313,2:POKE 51290,175:POKE
  51291,100
```

Here's a tip: Set variable V1 to 51248 and variable V2 to 51288. You can then refer to registers as V1+X and V2+X. Not only does this save on typing, but it's easier to remember. In the last example, you would need to type only:

```
POKE V2+25,2:POKE V2+2,175:POKE
  V2+3,100
```

Although the VIC-II chip can only handle eight sprites at a time, Double Display gets around this limitation by using the eight sprites twice. To understand how, consider the way a television set or computer monitor displays a picture. Sixty times a second (50 on European PAL systems), an electron beam, called a raster, redraws the screen display. The beam does this by drawing one pixel-high horizontal line after another as it scans down the screen.

Only 200 of these scan lines are visible, the first one being number 50. (You'll find that these are the same lines used to position sprites vertically.) Memory location 53266 in the C-64 keeps track of the current line being drawn. Basic is much too slow to take advantage of this, but Double Display, written in machine language, can easily use it.

When the top portion of the screen is being drawn, Double Display takes the first eight sprites' registers and copies them to the VIC-II's own memory, then waits until the first portion of the screen is finished. Next, it copies the following eight sprites' registers into VIC-II memory and waits for the electron beam to return to the first line and start again. The gullible VIC-II chip is fooled into displaying each of its sprites twice; the ninth sprite is really the first, and so on.

Parting Words

Two final points: First, three of the six routines (Instant Aid, Freeze Key and Double Display) use the C-64's IRQ vector. They are compatible with each other, so you can use all three at the same time. On the other hand, you may encounter trouble using them with other programs that hog the IRQ vector. If this happens, install the other routines first, and then install any of the three routines just mentioned. These routines share the vector with the program *preceding* them, thus this should eliminate any conflict.

Second, if you're a budding machine language programmer, you may be interested in disassembling the code for any of the routines. Looking at short, working code is a great way to improve your skills. While doing this, keep a good reference book handy to save time; anything with a comprehensive memory map of the C-64 will do nicely.

Now you can keep these six routines handy and use them to give your Basic programs a boost. R

Stephen Dirschauer is an enthusiastic C-64 and C-128 programmer who contributes frequently to RUN. ►

Table 1. Using wildcards to display files with Display Directory.

Statement	Function
OPEN1,8,0,"$*=S"	Lists only sequential files
OPEN1,8,0,"$DATA.*"	Lists only files with a "DATA." prefix
OPEN1,8,0,"$A*=P"	Lists program files beginning with A

Table 2. New sprite registers for use with Double Display.

Screen 1	Screen 2	VIC-II	Description
51248–51263	51288–51303	53248–53263	X/Y locations
51264–51271	51304–51311	2040–2047	Image pointers
51272	51312	53264	Last bit of X position
51273	51313	53269	Sprites enabled
51274	51314	53271	Vertical expansion
51275	51315	53275	Priority register
51276	51316	53276	Multicolor or hi-res
51277	51317	53277	Horizontal expansion
51278	51318	53285	Multicolor register 0
51279	51319	53286	Multicolor register 1
51280–51287	51320–51327	53287–53294	Sprite color registers

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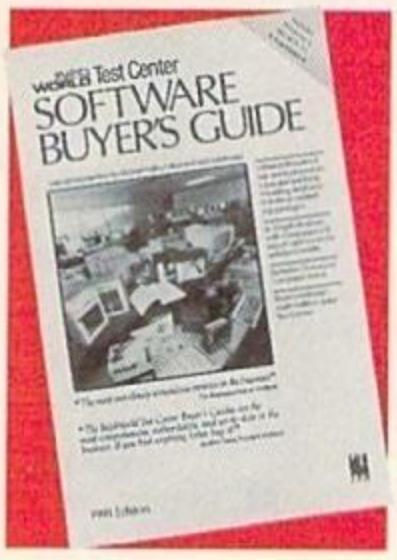

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Listing 1. Memory Search & Replace program. (Available on the March/April ReRUN disk. To order call 1-800/343-0728.)

```
100 REM MEMORY SEARCH & REPLACE
                          :REM*169
105 FORT=0TO62:READA:POKE50555+
    T,A:NEXT              :REM*158
110 DATA 32,131,174,32,247,183,
    132,251,133,252,32,131,174,
    32,247,183            :REM*200
115 DATA 140,176,197,141,182,19
    7,32,155,183,134,253,32,155
    ,183,134              :REM*52
120 DATA 254,160,0,177,251,197,
    253,208,4,165,254,145,251,2
    30,251                :REM*140
125 DATA 208,2,230,252,165,251,
    201,0,208,234,165,252,201,0
    ,208,228,96           :REM*209
```

Listing 2. Instant Aid program. (Available on the March/April ReRUN disk.)

```
100 REM INSTANT AID       :REM*165
105 FORT=0TO61:READA:POKE50618+
    T,A:NEXT              :REM*147
110 DATA 120,174,20,3,172,21,3,
    142,218,197,140,219,197,162
    ,211                  :REM*108
115 DATA 160,197,142,20,3,140,2
    1,3,88,96,165,203,201,3,240
    ,3                    :REM*147
120 DATA 76,49,234,173,24,208,7
    2,169,198,141,24,208,32,159
    ,255                  :REM*8
125 DATA 32,228,255,240,248,104
    ,141,24,208,76,217,197,197,
    76                    :REM*27
130 DATA 217,197          :REM*41
```

Listing 3. Sequential Scanner program. (Available on the March/April ReRUN disk.)

```
100 REM SEQUENTIAL SCANNER
                          :REM*138
105 FORT=0TO74:READA:POKE50682+
    T,A:NEXT              :REM*190
110 DATA 32,155,183,142,69,198,
    162,1,32,198,255,160,0,32,2
    07,255,72             :REM*184
115 DATA 165,144,240,5,104,32,2
    04,255,96,104,201,13,240,9,
    32,210,255            :REM*33
120 DATA 32,225,255,208,230,96,
    200,204,69,198,208,21,32,20
    4,255,32,228          :REM*149
125 DATA 255,208,6,32,225,255,2
    08,246,96,162,1,32,198,255,
    160,0,169             :REM*109
130 DATA 13,32,210,255,76,7,198
                          :REM*2
```

Listing 4. Display Directory program. (Available on the March/April ReRUN disk.)

```
100 REM DISPLAY DIRECTORY
                          :REM*29
105 FORT=0TO179:READA:POKE50764
    +T,A:NEXT             :REM*237
110 DATA 160,0,162,1,32,198,255
    ,32,197,198,32,207,255,141,
    253,198               :REM*21
115 DATA 32,207,255,13,253,198,
    208,15,206,255,198,96,32,19
    7,198                 :REM*96
120 DATA 32,207,255,208,3,76,10
    0,198,32,197,198,32,207,255
    ,72                   :REM*220
125 DATA 165,144,240,7,104,32,2
    04,255,76,100,198,32,225,25
    5,208                 :REM*163
130 DATA 7,104,32,204,255,76,10
    0,198,32,204,255,152,72,32,
    228,255               :REM*210
135 DATA 240,5,32,228,255,240,2
    51,104,168,162,1,32,198,255
    ,104                  :REM*118
140 DATA 201,34,208,202,32,207,
    255,201,34,240,7,153,0,199,
    200,76                :REM*156
145 DATA 172,198,32,203,198,32,
    207,255,208,251,76,86,198,3
    2,207,255             :REM*220
150 DATA 76,207,255,173,255,198
    ,208,6,238,255,198,76,245,1
    98,140                :REM*171
155 DATA 253,198,169,40,56,237,
    253,198,74,170,169,32,32,21
    0,255,202             :REM*141
160 DATA 208,250,169,0,153,0,19
    9,169,0,160,199,32,30,171,1
    69,13,32              :REM*92
165 DATA 210,255,160,0,96,0,0,0
                          :REM*244
```

Listing 5. Freeze Key program. (Available on the March/April ReRUN disk.)

```
100 REM FREEZE KEY        :REM*49
105 FORT=0TO57:READA:POKE50960+
    T,A:NEXT              :REM*138
110 DATA 120,174,20,3,172,21,3,
    142,48,199,140,49,199,162,4
    1,160,199             :REM*155
115 DATA 142,20,3,140,21,3,88,9
    6,165,203,201,41,240,3,76,2
    38,238                :REM*212
120 DATA 173,141,2,201,4,208,24
    6,238,32,208,32,159,255,32,
    228,255               :REM*4
125 DATA 240,248,206,32,208,76,
    47,199                :REM*238
```

Listing 6. Double Display program. (Available on the March/April ReRUN disk.)

```
100 REM DOUBLE DISPLAY    :REM*212
105 FORT=0TO229:READA:POKE51018
    +T,A:NEXT             :REM*118
110 DATA 32,155,183,142,128,200
    ,120,174,20,3,172,21,3,142,
    228                   :REM*172
115 DATA 199,140,229,199,162,13
    9,160,199,142,20,3,140,21,3
                          :REM*28
120 DATA 169,129,141,26,208,173
    ,128,200,141,18,208,173,17,
    208                   :REM*6
125 DATA 41,127,141,17,208,160,
    75,169,0,153,48,200,136,16,
    250                   :REM*2
130 DATA 169,127,141,13,220,88,
    96,173,25,208,141,25,208,41
    ,1                    :REM*146
135 DATA 208,3,76,188,254,173,1
    29,200,240,73,206,129,200
                          :REM*28
140 DATA 169,0,141,18,208,160,1
    5,185,88,200,153,0,208,136,
    16                    :REM*1
145 DATA 247,160,7,185,104,200,
    153,248,7,136,16,247,160,2,
    185                   :REM*125
150 DATA 115,200,153,27,208,136
    ,16,247,160,9,185,118,200,1
    53                    :REM*222
155 DATA 37,208,136,16,247,173,
    112,200,141,16,208,173,113
                          :REM*88
160 DATA 200,141,21,208,173,114
    ,200,141,23,208,76,221,221,
    238                   :REM*114
165 DATA 129,200,173,128,200,14
    1,18,208,160,15,185,48,200,
    153                   :REM*51
170 DATA 0,208,136,16,247,160,7
    ,185,64,200,153,248,7,136,1
    6                     :REM*166
175 DATA 247,160,2,185,75,200,1
    53,27,208,136,16,247,160,9
                          :REM*201
180 DATA 185,78,200,153,37,208,
    136,16,247,173,72,200,141,1
    6                     :REM*21
185 DATA 208,173,73,200,141,21,
    208,173,74,200,141,23,208,7
    6                     :REM*14
190 DATA 188,254          :REM*78
```

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Smart Shopper

Check it out! This program for organizing your grocery lists adds new meaning to the term "convenience store."

By ALAN BRADFORD

Have you ever walked into a supermarket with a shopping list, pushed your cart up and down the aisles selecting cans and boxes, and then waited half-way through the check-out line . . . only to realize you hadn't picked up the stuffed artichokes? They were right there on the list, two items from the bottom, but you missed them because stuffed artichokes are in the *first* aisle, not the last. Use Super Aisle Organizer and it will never happen again!

Super Aisle Organizer is a specialized database program that lets you browse through a list of items you usually purchase on your weekly safari to the supermarket and select the ones you want on the current trip, then print out a list of those items *organized by aisle*. You won't forget anything, and you won't have to retrace steps for things you missed.

The program is written entirely in Basic and uses two sequential files for the item, aisle and store data. You can include up to 500 items and five stores (the same items for all stores) in your master list.

Type in Super Aisle Organizer from Listing 1 using *RUN*'s Checksum program on page 60. The program's Main menu offers the following three options, plus Quit:

The *Shopping List option* lets you select a store and items to buy, then print out a shopping list. When you choose a store, the master list of items will appear on the screen. Press the space bar to move the cursor down to the next item, press C to go to the second column on the page, and press N to go to the next page. To select an item, press the Return key, then respond to the prompt for quantity by pressing return again for one, or by typing a number and pressing return for more.

You can print out a list at any time. It will show the store name at the top, then the items under their appropriate aisles.

The *Edit List option* lets you add items and stores to your master list and make any needed changes. It will also make a printout of an incomplete master list that you can take to the store with you so that you can fill in aisle numbers.

To add an item to the master list, type its name and aisle number (15 characters maximum) for each store. If you don't know the aisle at a certain store, enter 0. If an item isn't available at one of the stores, enter 99 for the aisle. Number 98 is for the aisle running along the back wall of a store. When you're done, press the £ key to return to the Edit menu.

To alter item and store names or aisle numbers, choose the appropriate Edit menu option and follow the prompts.

When you're ready to print out your master list, select the Edit menu's print option. The items will appear in alphabetical order, along with aisle numbers for all stores.

After you're done making additions or changes, return to the Main menu and the new data will be saved to disk automatically.

The Main menu's *New Disk Setup* option creates two data files, Grocery and Shopdata, on a freshly formatted disk. It's a good idea to save a copy of the program on this disk, too. To make backup copies of the data files, open the Edit Items menu, swap to the data disk, and exit the menu: the data will be written to the new disk. Finally, save a copy of the program to the data disk as well.

Now, thanks to your trusty Commodore computer, you'll never go without stuffed artichokes again! R

Alan Bradford has a degree in electronics and installs and services computer systems.

Listing 1. Super Aisle Organizer program. (Also available on the March/April ReRUN disk. To order call 1-800/343-0728.)

```
10 REM SHOPPING LIST ORGANIZER
                              :REM*53
20 POKE5328Ø,14:POKE53281,14:PR
   INT"{CTRL 2}"              :REM*7Ø
30 XP$="-> ":PR$="{CTRL 2}-->{C
   TRL 2}":SP$="{3 SPACEs}":BS$
   ="{3 CRSR LFs}":SC$="{2Ø CRS
   R RTs}"                    :REM*219
40 FR$="{26 SPACEs}"          :REM*21
50 LN$="----------------------
   ----------"                :REM*81
60 DIMM$(5ØØ),W$(5Ø),KF(5ØØ,2),
   IN(5ØØ,6)                  :REM*22
70 DIMIU(99):GOTO6ØØ          :REM*143
80 FORQQ=1TO1Ø:GETK$:NEXTQQ:QQ=
   FRE(Ø):RETURN              :REM*83
90 PRINT"SORTING......";NG+1
                              :REM*66
100 IFZ$<M$(KF(1,1))THENIS=1:GO
    TO170                     :REM*185
110 IFZ$>M$(KF(NG,1))THENIS=NG+
    1:GOTO18Ø                 :REM*186
120 MN=1:IS=NG                :REM*12Ø
130 HP=INT((MN+IS)*.5):IFHP=MNT
    HEN17Ø                    :REM*22Ø
140 IFZ$>M$(KF(HP,1))THENMN=HP:
    GOTO13Ø                   :REM*226
150 IFZ$<M$(KF(HP,1))THENIS=HP:
    GOTO13Ø                   :REM*2Ø5
160 MN=HP:IS=HP+1             :REM*26
170 FORM=NGTOIS STEP-1:KF(M+1,1
    )=KF(M,1):NEXTM           :REM*234
180 NG=NG+1:IFCS=1THEN2ØØ
                              :REM*19Ø
190 M$(NG)=Z$:KF(IS,1)=NG:RETUR
    N                         :REM*237
200 KF(IS,1)=TK:M$(TK)=Z$:CS=Ø:
    RETURN                    :REM*182
210 I=Ø:ZX=Ø:D=Ø:CL=Ø:ZZ=Ø:FC=2
    2:SC=44:PRINT"{SHFT CLR}";
                              :REM*147
220 FORX=1TO23:PRINT:NEXTX
```

RUN it right: **C-64 or C-128 (in 40- or 80-Column mode)**

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SMART SHOPPER

```
                          :REM*202
230 PRINT"{24 SPACEs}{CTRL 9}C=
    CHANGE COLUMN"        :REM*91
240 PRINT"{CTRL 9}SPACE=NEXT CR
    =SELECT P=PRINT N=NEXT PAGE
    {HOME}{CTRL Ø}";      :REM*14
250 FORX=LP+1TOFC+LP:PRINTSP$M$
    (KF(X,1)):NEXTX       :REM*69
260 PRINT"{HOME}";:FORX=LP+FC+1
    TOSC+LP:PRINT"{3 CRSR RTs}"
    ;SC$M$(KF(X,1)):NEXTX
                          :REM*235
270 PRINT"{HOME}";PR$;BS$;
                          :REM*237
280 IFZZ<15THENZX=1:GOTO31Ø
                          :REM*108
290 IFZZ<3ØTHENZX=2       :REM*246
300 IFZZ>3ØTHENZZ=Ø       :REM*240
310 ONZXGOTO32Ø,33Ø,34Ø:REM*176
320 PRINTPR$;BS$;:GOTO34Ø
                          :REM*226
330 PRINTXP$;BS$;         :REM*50
340 GET K$:ZZ=ZZ+1:IFK$=""THEN2
    8Ø                    :REM*72
350 IFK$=CHR$(32)THEN43Ø
                          :REM*158
360 IFK$=CHR$(13)THEN48Ø
                          :REM*222
370 IFK$=CHR$(67)AND CL=FCTHENC
    L=Ø:PRINTSP$:PRINT"{CRSR UP
    }";:GOTO34Ø           :REM*96
380 IFK$=CHR$(67)THENCL=FC:PRIN
    TSP$;"{3 CRSR LFs}";SC$;PR$
    ;BS$;:GOTO34Ø         :REM*74
390 IFK$=CHR$(78)THENPRINT"{SHF
    T CLR}":RETURN        :REM*153
400 IFK$=CHR$(8Ø)THENPRINT"{SHF
    T CLR}":RETURN        :REM*72
410 GOTO28Ø               :REM*236
420 PRINT"{CRSR UP}";PR$;BS$;:G
    OTO34Ø                :REM*18
430 D=D+1:PRINTSP$        :REM*14
440 IFD=FCTHEND=Ø:PRINT"{HOME}"
    ;                     :REM*32
450 IFCL=FCTHEN47Ø        :REM*124
460 PRINTPR$;BS$;:GOTO34Ø
                          :REM*153
470 PRINTSC$;PR$;BS$;:GOTO34Ø
                          :REM*221
480 I=D+CL+LP+1:PRINTSP$;"{CTRL
     9}";M$(KF(I,1));"{CTRL Ø}"
    :D=D+1                :REM*208
490 IFFC-D=ØTHEN51Ø       :REM*77
500 FORZ=1TOFC-D:PRINT"{CRSR DN
    }";:NEXTZ             :REM*168
510 QY$="":INPUT"QUANTITY";QY$
                          :REM*179
520 QY=VAL(QY$):IFQY<.Ø1THENQY=
    1                     :REM*237
530 PRINT"{CRSR UP}";SP$SP$SP$S
    P$SP$SP$SP$:FORZ=1TOFC-D+1:
    PRINT"{CRSR UP}";:NEXTZ
                          :REM*16
540 IFCL=FCTHENPRINTSC$;
                          :REM*231
550 PRINTSP$;"{CTRL 1}{CRSR UP}
    ";M$(KF(I,1));"{CTRL 2}";QY
    :                     :REM*16
560 IU(IN(KF(I,1),SN))=1:KF(I,2
    )=QY:QY=1:GOTO44Ø     :REM*Ø
570 PRINT"{SHFT CLR}{2 CRSR DNs
    }{2 SPACEs}SELECT STORE"
                          :REM*52
580 FORX=1TO5:PRINTX;"{3 SPACEs
    }";SN$(X):NEXTX       :REM*72
590 HS=5:GOSUB 198Ø:SN=ZZ:RETUR
    N                     :REM*99
600 PRINT"{SHFT CLR}{11 CRSR DN
    s}{8 SPACEs}LOADING DATA FI
    LE...GROCERY"         :REM*143
610 OPEN15,8,15:OPEN1,8,8,"Ø:GR
    OCERY,S,R":INPUT#1,NG
                          :REM*54
620 FORX=1TONG:INPUT#1,M$(X)
                          :REM*45
630 INPUT#1,KF(X,1):NEXTX:CLOSE
    1:CLOSE15             :REM*66
640 PRINT"{SHFT CLR}{11 CRSR DN
    s}{8 SPACEs}LOADING DATA FI
    LE...SHOPDATA"        :REM*196
650 OPEN15,8,15:OPEN1,8,8,"Ø:SH
    OPDATA,S,R"           :REM*32
660 FORX=1TO5:INPUT#1,SN$(X):NE
    XTX                   :REM*137
670 FORX=1TONG:FORZ=1TO5:INPUT#
    1,IN(X,Z):NEXTZ:NEXTX:CLOSE
    1:CLOSE15             :REM*23Ø
680 PRINT"{SHFT CLR}{2 CRSR DNs
    }{5 SPACEs}SHOPPING LIST
                          :REM*216
690 PRINT"{7 SPACEs}MAIN MENU"
                          :REM*17
700 PRINT"SHOPPING LIST----->1"
                          :REM*33
710 PRINT"EDIT LIST--------->2"
                          :REM*105
720 PRINT"NEW DISK SETUP---->3"
                          :REM*185
730 PRINT"QUIT-------------->4"
    :HS=4:GOSUB198Ø       :REM*197
740 ON ZZ XGOTO75Ø,98Ø,181Ø,197
    Ø                     :REM*11
750 LP=Ø:GOSUB57Ø:PRINT"{SHFT C
    LR}{11 CRSR DNs}{8 SPACEs}S
    ETTING UP GROCERY LIST..."
                          :REM*41
760 GOSUB21Ø:IFK$="P"THEN79Ø
                          :REM*20
770 IFLP+44>NGTHEN79Ø     :REM*159
780 LP=LP+44:GOTO76Ø      :REM*145
790 PRINT"{SHFT CLR}{CRSR DN} {
    CRSR DN} {CRSR DN} {CRSR DN
    } {CRSR DN} SET UP PRINTER
    AND HIT ANY KEY"      :REM*115
800 PRINT"{15 SPACEs}WHEN READY
    "                     :REM*183
810 GETK$:IFK$=""THEN81Ø :REM*8
820 OPEN3,4:PRINT#3,SN$(SN):PRI
    NT#3,                 :REM*238
830 FORZ=ØTO99:FI=Ø:TL=Ø:IFIU(Z
    )=ØTHENNEXTZ:GOTO93Ø:REM*43
840 FORX=1TONG:IFKF(X,2)<>Ø AND
     IN(KF(X,1),SN)=Z THEN86Ø
                          :REM*198
850 NEXTX:NEXTZ:GOTO93Ø:REM*153
860 IF FI<>ØTHEN88Ø       :REM*206
870 PRINT#3,:PRINT#3,LN$;"AISLE
     # ";Z;LN$:FI=1:PRINT#3,
                          :REM*40
880 TV$=LEFT$(((STR$(KF(X,2)))+
    FR$),4)               :REM*106
890 TG$=LEFT$((TV$+(M$(KF(X,1))
    +FR$)),2Ø)            :REM*90
900 PRINT#3,TG$;:TL=TL+1
                          :REM*170
910 IFTL=4THENTL=Ø:PRINT#3,
                          :REM*238
920 NEXTX:PRINT#3,:TL=Ø:NEXTZ
                          :REM*43
930 PRINT#3,              :REM*33
940 PRINT#3,LN$;"END OF LIST";L
    N$                    :REM*84
950 PRINT#3,              :REM*61
960 CLOSE3:FORX=1TO99:IU(X)=Ø:N
    EXTX                  :REM*64
970 FORX=1TONG:KF(X,2)=Ø:NEXTX:
    GOTO68Ø               :REM*21
980 PRINT"{SHFT CLR}{3 CRSR DNs
    }{7 SPACEs}EDIT MENU"
                          :REM*108
990 PRINT"ENTER NEW ITEMS------
    >1"                   :REM*20
1000 PRINT"ENTER STORE NAMES---
    ->2"                  :REM*85
1010 PRINT"EDIT ITEMS----------
    ->3"                  :REM*106
1020 PRINT"PRINT DATA----------
    ->4"                  :REM*16
1030 PRINT"RETURN TO MAIN MENU-
    ->5":HS=5:GOSUB198Ø
                          :REM*176
1040 ON ZZ XGOTO113Ø,125Ø,134Ø,
    166Ø,185Ø             :REM*175
1050 PRINT"{SHFT CLR}{11 CRSR D
    Ns}{7 SPACEs}SAVING USER F
    ILE..GROCERY"         :REM*233
1060 OPEN15,8,15:OPEN1,8,8,"@Ø:
    GROCERY,S,W"          :REM*122
1070 PRINT#1,NG:FORZZ=1TONG:PRI
    NT#1,M$(ZZ)           :REM*45
1080 PRINT#1,KF(ZZ,1):NEXTZZ:CL
    OSE1:CLOSE15          :REM*20
1090 PRINT"{SHFT CLR}{11 CRSR D
    Ns}{7 SPACEs}SAVING USER F
    ILE..SHOPDATA"        :REM*147
1100 OPEN15,8,15:OPEN1,8,8,"@Ø:
    SHOPDATA,S,W"         :REM*236
1110 FORX=1TO5:PRINT#1,SN$(X):N
    EXTX                  :REM*40
1120 FORX=1TONG:FORZ=1TO5:PRINT
    #1,IN(X,Z):NEXTZ:NEXTX:CLO
    SE1:CLOSE15:GOTO68Ø:REM*21
1130 PRINT"{SHFT CLR}INPUT NEW
    ITEMS"                :REM*63
1140 PRINT"Ø=UNKNOWN AISLE{3 SP
    ACEs}99=NOT AVAILABLE"
                          :REM*211
1150 PRINT"98=BACK WALL{6 SPACE
    s}{LB.}=RETURN TO EDIT MEN
    U"                    :REM*79
1160 INPUT"ITEM--";Z$:IFZ$="{LB
    .}"THEN 98Ø           :REM*101
1170 Z$=LEFT$(Z$,15):PRINT"ITEM
    -->";Z$               :REM*96
1180 PRINT"TYPE N FOR NO OR RET
    URN FOR YES";         :REM*57
1190 INPUTZZ$:IFZZ$="N" OR ZZ$=
```

Continued on page 58.

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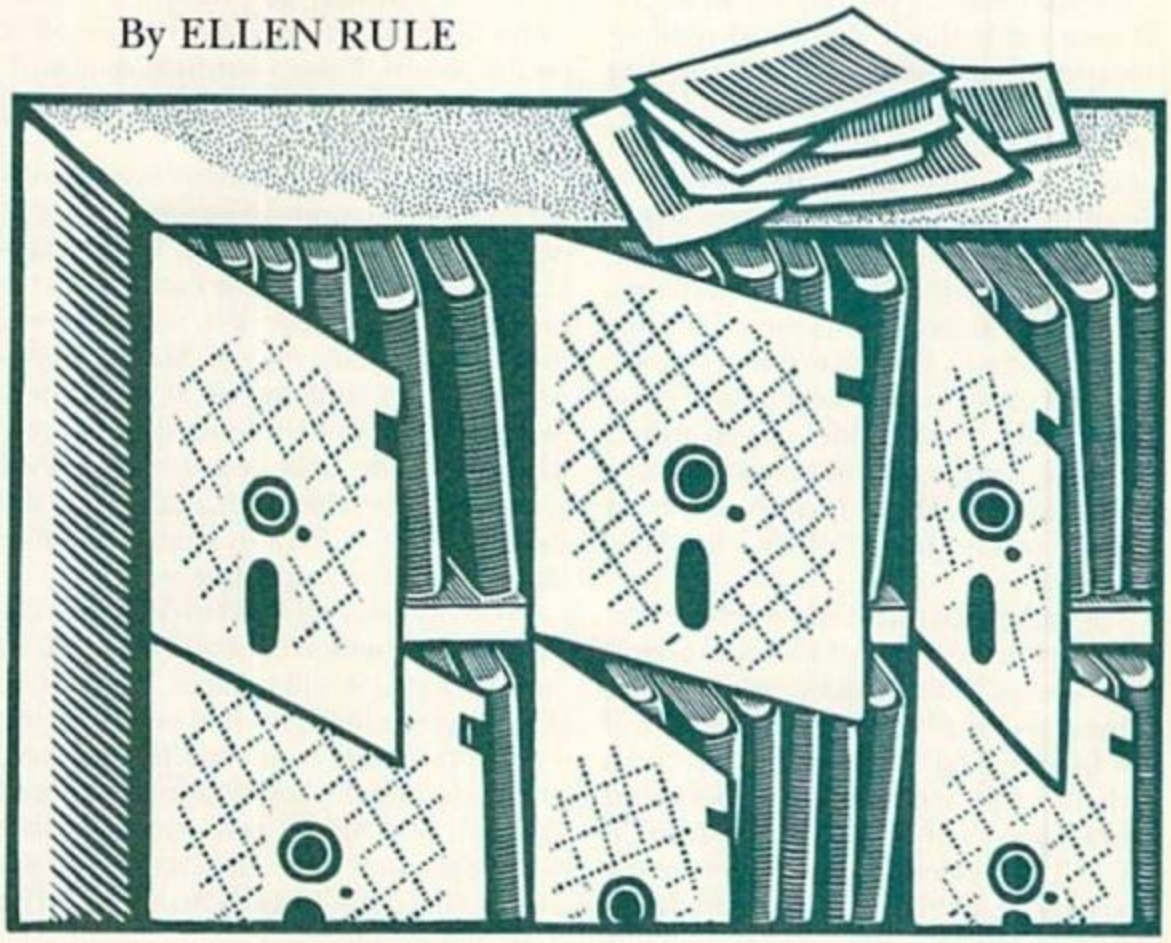
"File It!"

database \ dāt-a-bās, dat- \ *n* (1967) : the ideal tool for storing, searching and organizing information



By ELLEN RULE

If you bought a computer to help you get organized, you're in good company. Perhaps you'd like to make an inventory of your baseball cards, video games or the movies you've recorded. Your name and address files can be stored on disk and accessed in order to print handy items such as a phone list or mailing labels. While a word processor could be used to store any of this text-based information, the ideal tool for the job, one that can search, sort and ultimately help you get organized, is the database utility.

What is a Database?

Think of a database as a filing card system in which each set of cards may be as small or as big as needed to hold the information desired. Like the catalog cards at the public library, each card can be cross-referenced and sorted, but now with amazing speed. A friend once called me for the address of a fellow user's group member. "You have that in your database," I reminded her. "I know because it's in the printout you gave me." I reached for the printout, and in the time it took me to thumb through and find the name, she had turned on her computer, booted her database and found the address she needed. Hard to believe.

Mail-order catalogs for Commodore computers, as well as Commodore-oriented software stores, carry several database titles for the C-64 and C-128. While the particulars vary, the principles of setting up and using a database are pretty much the same. In this tutorial, I'll guide you through the procedure of setting up a database, using a name and address file as our example. Reference will be made to several popular database packages, including RUN File, geoFile, Fleet Filer (from Fleet System 4) and Pocket Filer 2. You might also want to consider DataFile, Data Manager, Superbase or other widely used programs. Depending on the software, hardware requirements generally include a C-64 or C-128 with TV or monitor, a disk drive to store your data, and a printer with which to produce reports.

Files, Records and Fields

One database program can create and access several different files. You might have your Christmas card list in one file, paper route customers in another and your stamp collection in yet a third. Within a database file are records, each of which can be thought of as a file card or page; a record will hold all pertinent data about each separate item in your file. Within each record, each piece of data occupies a field. In a name and address file, street, city and state might each reside in a separate field.

Design Layout

Using a database requires some planning. Before you even turn on your computer, sketch out what you want a record ("file card") to look like. (Maybe you have information on file cards or in a rolodex that you want to transfer to the computer.) Lay out each field, thinking carefully about the design; once set up, some databases are difficult, or even impossible, to reformat.

Think about your options. For most name/address applications, the first item, or field, will be an individual's name. Should you have the entire name in one field, or have separate fields for first and last names? Hint: You'll probably want to search and sort based on the last-name field. How many people in your file will have titles (Mr., Dr., President)?

Bear in mind that, because of the way the Commodore computer accepts input, some databases won't let commas be part of your data entry. This is because, in Basic, commas are used as separators between data items. As a result, if you want to enter last-name-comma-first-name, you must check your software manual carefully to make sure the first name, after the comma, won't be ignored. ►

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Now for the address fields. One or two lines? A lot of people have a rural route as well as a street name, while others have a street, building name and apartment number. You might want the option of including a company name. Think about how much space you'll need.

Most name/address files have separate fields for city, state and zip code, to let you sort on these fields—a help to the Postal Service during rush seasons and a necessity for using bulk mail. Don't forget a field for phone numbers, allowing space for the area code.

You may want to provide for some additional fields that a dedicated mailing label program wouldn't allow. If the data is comprised largely of friends and relatives, you might want to include birth dates and anniversaries. In an address file of mixed acquaintances, you might want a one- or two-character code to indicate the relationship: friend, relative, or business associate. Maybe a field for Christmas cards sent/received or a space for notes about business clients would be appropriate. Get the idea? Even with a computer, getting organized requires some thought. Hint: Include an extra field or two, entitled "other," for later flexibility.

The more separate fields you have, the broader your search and sort options will be. However, if the software stores all files in memory, this increased flexibility will cost by reducing the number of records each file will accommodate. Sort and search speed will be slowed accordingly.

You'll also need to decide how many characters each field should hold, keeping in mind the limitations of your database software. A character is a letter, number, punctuation mark or space. Estimate the length of each field, using your rolodex or file cards for reference. Check your software manual to see if your database limits the number of fields a record may contain, or the number of characters within each field.

When you've finished your plan, your file might look like this: Field 1: first name (15 characters) Field 2: last name (25 characters) Field 3: street (20 characters) Field 4: city (15 characters) Field 5: state (2 characters) Field 6: zip (10 characters) Field 7: phone (12 characters) Field 8: code (2 characters) Field 9: other (10 characters).

Let's Do It!

Now you're ready to load your database software, using the commands detailed in the manual. (In many cases, LOAD":*",8 or LOAD":*",8,1 will do the trick.) Select the option for creating a new file—for instance, N for New in RUN File, C for Create in Fleet Filer, or F1 to create in Pocket Filer 2. In RUN File or geoFile, you'll be prompted for a name for the file. Make the name applicable and specific. "Names" may be fine for now, but "business contacts" may be more helpful for reference later on.

Next you must define your fields. Some database programs, such as RUN File, geoFile and Pocket Filer 2, use a layout method, where you map out your fields on the screen. With Fleet Filer, you'll just be prompted to start entering the field names. With other database software, you may be prompted first to enter the number of fields to be included in the record. Enter your field data and, if required, how many characters you want each field to hold.

In creating an on-screen layout with RUN File, use control/F to mark the start and end of each field. With Pocket Filer 2, tap the F1 key once for each character in the field. GeoFile lets you define a field graphically on the Master Form screen. Point your mouse at the upper-left corner of your intended field area, click, drag the field box to the desired shape and size, then click again to set the box. GeoFile differs in that you name each field after you define it.

Next, format each field to designate the type of information (alphabetic, numeric, and so forth) it will contain. With RUN File, after the fields are laid out, press the run-stop (C-64) or escape (C-128) key, then select alpha, key, numeric or special for each field. Select "key"—your primary sort field—only once. (In a name and address file, this usually would be the Last Name field.)

With Pocket Filer 2, F5 initiates a series of questions to format each field. Most fields will be defined as alpha or text. Use numeric fields to perform limited data calculations. (For more complex calculations, you may want to use a spreadsheet program.) Hint: Be sure to define your phone number field as text rather than numeric; otherwise, your database may subtract the last four digits from the first three, and you'll lose zeros at the beginning of codes!

When you've entered names and sizes for all the fields you plan, save your design on your data disk, a formatted disk that's separate from the disk holding your database program.

Entering Your Data

Once the design is settled, you're ready to start entering data. With Pocket Filer 2, select F3 for enter/edit; use the "add records"option with Fleet Filer, or the Open option with RUN File. Start out by entering the data for a few records, perhaps selecting randomly from the data with which you'll be working. Then exit to the main menu of your program (by whatever command the software requires) and try saving your data. Walking through the entire procedure will enable you to discover little quirks or bugs in your setup, so you won't spend hours entering mountains of data only to have problems saving or using it. You might also decide during your test run that your design is awkward or unworkable. Now is the time to find out!

It's not a good idea to store data files on the database program disk. If you're working with a one-drive system and the database doesn't prompt you to swap out your program disk and insert your data disk, make sure you're working with a copy of your database program, not the original! The original could fill up awfully fast!

When storing large amounts of data on your computer, whether via word processor, database or spreadsheet, anticipate the worst when it comes to losing data. Save your file frequently, perhaps every 15 minutes or after so many pages. Use a back-up data disk, and remember to update it when you update your data file. Also, store complete copies of your data file and database program in the oft-mentioned "safe place." The few minutes this takes could save hours of rekeying later on.

Search versus Sort

Sorting and searching are the two features that make a database unique from other software. "Search" is used to find a given piece of information. In RUN File, upon giving the search command (F1), you'll be prompted for the "search string." The software will match the search string (the text you type in) with items in the database in order to find the information you're looking for. Need to find Nancy Smith's phone number? Search for records that have a last name of Smith, and, if your database allows for multiple search criteria, a first name of Nancy as well. Can't remember Bob what's-his-name's address but you know he lives in Boston? A search of first-name and city fields should turn him up. With RUN File, use F8 for a printout of the record once you find it.

"Sort" means to reorder all the records in the file in ascending (A–Z) or descending (Z–A) order. When you give a sort command, you'll be prompted to enter your sort criterion (the field on which you want your data sorted). Most address files are sorted by last name, but you may want to sort by zip code for bulk mailing. (I know some regional salesmen who sort

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by zip in order to contact their customers while they are on the road.)

Mailing Labels and Reports

The value of your data increases with the ability to print out mailing labels for your Christmas letters, household inventory reports for your insurance company, or a simple data dump to hard copy for your files. Your database may have a variety of print options—mailing labels, formatted reports, calculated reports—as well as an unformatted data dump option. Select F5, Utils, in Pocket Filer 2, Print in RUN File or Print from the drop-down menu in geoFile.

For mailing labels, you'll need to set up the number of lines the label will contain and how many fields will be on each line. Some databases have a preset label format (called a "template") that can't be modified. Examine this format before you set up your database to avoid setting up an incompatible design.

Formatted and calculated reports are usually designed in a columnar layout. Field titles run across the top, beneath an optional report title. The number of characters across the page may be adjusted for wide-carriage printers or normal-width printers with condensed-print options. You may want to include all the fields in your record, or only selected items. For example, using the name and address fields from our example to print a phone list, the report might look like this: Column 1: field 2 (last name, 25 characters), Column 2: field 1 (first name, 15 characters), Column 3: field 7 (phone number, 12 characters).

Your database manual should include examples of report formats and mailing labels for you to use as guidelines. Because database software allows versatility in report formats, the process may seem a bit complex. Try running a test printout on scrap paper to avoid wasting high-quality paper or costly labels. For labels, place the test sheet against a sheet of labels, then look at them against a light to check positioning.

Select a printer type by whatever means your software requires; your database manual will describe how. You may have to "install" the printer before running the database itself by copying a printer driver onto your work disk (geoFile), or you may have to select a printer driver from a list of drivers included on the disk. Some database software simply assumes that you have a Commodore-compatible printer. In this case, special features, such as bold, condensed and italic print, may be limited.

Exit Gracefully

When you're done working with your data, exit the program through the designated key combination rather than by just shutting off your computer. Databases often write the file update to disk when you exit. If you fail to follow through with this procedure, you may lose data.

Putting your computer to work for you can take some planning and thought. Once in place, however, a database system can save you a lot of time and energy. Yes, you too can become organized! Isn't that why you bought your computer? ■

Ellen Rule is one of RUN*'s contributing editors and the magazine's Commodore Clinic columnist. She also runs a home-based business called Home Computer Resource.*

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Super Character Editor

Here's an easy way for programmers to create custom characters in every graphics mode.

By ROCCO SAYA

What's that? You say you would like an all-purpose character editor that is easy to use, and yet powerful enough to let you leap over even your most towering needs? Look no further—Overkill is here.

Overkill is a character editor with over 30 functions and a professional look and feel that experienced programmers will find useful. Overkill simplifies the process of redefining characters that can be used in any of the C-64's graphic modes. Because there are over 30 functions in the program, but no menus, learning to use it proficiently will take time. However, I expect you'll soon come to enjoy it as much as I do.

To use Overkill, begin with a formatted work disk. Type in Listing 1 and save it to the disk. Turn off or reset your computer, then load and run *RUN*'s Checksum program (see page 60). Next, type in Listing 2 using the Checksum, and after saving it to disk, run it to create the file "Overkill.ML". Finally, load and run Listing 1 to execute Overkill.

Getting Started

When the split screen appears, you'll notice that the top window is for actual editing. Here, all important registers are displayed, along with an eight pixel-by-eight pixel area where you can redefine characters.

The bottom window displays an entire character set. You'll also notice right away that the bottom window is full of junk. Don't worry—it's just static memory. I kept the junk out of the top window by using a raster routine that displays separate character graphics pages at the top and the bottom. Any work you do on your page at the bottom won't affect the display at the top. In this way, you'll never be working without being able to see what you're doing.

Overkill will let you edit characters in either multicolor or hi-res format. In addition, it provides four separate character graphics pages for you to work on.

To minimize confusion, the first time you use Overkill press F5 and answer Y to the prompt. The bottom window will contain the normal Commodore character graphics. Now that things look a little better, notice that your cursor is in the bottom window around the letter a. Use the cursor keys to move anywhere in the bottom window to pick a character. There are two other cursors in the bottom that I'll explain later.

To exit Overkill, press the Run/Stop and Restore keys simultaneously.

Editing Commands

For Overkill to function properly, some commands are available only in one window. If not specified, however, a command is available in both windows.

Choose a character to edit. Place your cursor on the desired character and press F1. The bottom cursor will disappear and another cursor will appear inside the eight-by-eight pixel editing area in the top window. Now you can use the cursor keys to move this cursor around. To get back to the bottom window, press F1 again.

Hi-res editing. Press the space bar to toggle a single pixel on or off. Top window only.

There are four **multicolor editing commands**. These are available in the top window only. They are:

Plot bit pattern 01. Press 1 and Multi 1 displays at the top-right. This is also the Background Color 1 register (53282, or $D022) used in multicolor mode.

Plot bit pattern 10. Press 2 and Multi 2 appears at the top-right. This is also the Background Color 2 register (53283, or $D023) used in multicolor mode. ►

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Plot bit pattern 11. Press 3 to display color RAM at the top-right. Multicolor characters use the actual screen color of a character for this bit pattern.

Plot bit pattern 00. Press 0 and the background color is displayed at the top-right. It just erases a pixel using the actual Background Color 0 from register 53281, or $D021.

Note that in Multicolor mode you lose half the horizontal resolution available on the C-64, because the C-64 needs extra information to be able to display multicolor characters. Therefore, in Multicolor mode you'll plot two pixels at a time, horizontally.

Switching modes. To toggle between Hi-Res or Multicolor mode, press M. This affects the bottom window only. When incorporating a character graphics page into your own program, you must use register 53270, which is a control register. To make your character graphics page multicolor, use POKE 53270,PEEK(53270)OR16. To make it hi-res again, use POKE53270,PEEK (53270)AND239.

The following four commands are for **changing the four color registers**:

Change multicolor mode 1. Press F2.
Change multicolor mode 2. Press F4.
Change color RAM. Press F6.
Change background. Press F8.

Pressing these keys allows you to cycle through the available colors. Keep pressing the appropriate key until you get the color you want.

Be aware that when you're in Multicolor mode, color RAM must stay at eight or below to be displayed properly. If it's above eight and you switch to Multicolor, the color RAM will automatically change to eight less than its current value.

Also note that the value of color RAM in the bottom window is actually eight more than indicated. For a character to be displayed in multicolor, its screen color must be higher than seven. If it's not, the character will be displayed in hi-res. In this way, the C-64 can display multicolor and hi-res characters simultaneously in Multicolor mode.

Just remember that when you want to display a multicolor character, you must make sure its screen color is between eight and 15. Also, even though its screen color is above eight, its color RAM nibbles will be shown as a value of eight less than the screen color.

Erase a character. Press the Clear/Home key to erase the current character.

Rotate 90 degrees. Press > to rotate a character 90 degrees clockwise. Note that this causes strange results to occur in Multicolor mode.

Mirror horizontally. Press shift/R to produce a mirror image of a character in a horizontal perspective.

Characters are edited in the top window.

Mirror vertically. Press F to produce a mirror image of a character in a vertical perspective.

Reverse video. Press R to create a negative image of the character. This results in some blurring in Multicolor mode.

Copy character into buffer. Pressing I puts the current character into the character buffer.

Replace character with buffer. Pressing O replaces the current character with the contents of the character buffer, effectively copying a character.

Replace character with ROM image. Pressing F3 replaces the current character with the default ROM image.

Show data. Press D to display the Data statements that define the character. Bottom window only.

Scroll character. Press the Back Arrow (←) then the Cursor keys to move the current character bit-by-bit in any direction. When in Multicolor mode, scroll left or right twice to achieve proper results. When you scroll a character, all pixels will wrap around. To toggle in and out of this mode, press ←.

Change page. Press P. Overkill lets you work on up to four separate pages. Table 1 contains a list of them, their memory locations and the appropriate pokes for the VIC chip memory control register, which resides at memory location 53272.

In order for your own program to display your character graphics page, you poke a value into location 53272, for the page involved. To get the default character graphics back, just POKE 53272,21. Remember that these pages are independent of one another, and normally you can use only one at a time. I say "normally," because it is possible to have more than one character graphics page on the screen at once, and Overkill will do this. However, it's beyond the scope of this article to explain the raster interrupts required. If you wish to learn raster interrupts, or other special tricks, I recommend the book *Mapping the Commodore 64 & 64C* by Sheldon Leemon, a *Compute!* books publication. You may find other books that can help, too.

Table 1. VIC chip memory control register addresses and pokes for the four pages available with Overkill.

Addresses	Pokes
8192–10239	POKE 53272,24
10240–12287	POKE 53272,26
12288–14335	POKE 53272,28
14436–16383	POKE 53272,30

The next four commands are for **manipulating an entire character graphics page**. For your program's safety, a prompt will ask if you're sure you want to issue the command. They are:

Copy entire page into page buffer. Press shift/I to put the entire current page into the page buffer.

Replace entire page with page buffer. Pressing shift/O replaces the entire current page with the contents of the page buffer.

Replace entire page with character ROM. Pressing F5 replaces the entire character page with the default characters.

Erase entire page. Pressing F7 erases the entire character page.

Disk Operation Commands

The rest of Overkill's commands deal with disk operations. If an error occurs while you're accessing your drive, the program reports it.

Before describing the disk commands, I should mention that a page save occurs within a specified range of memory, defined by beginning and ending markers. The default for start-of-range is zero and the default for end-of-range is 255. With the default settings, the Save command will store the entire *current* character graphics page. However, the first two disk commands will let you alter the range, so you can save any portion of the current character graphics page. After any disk activity is complete, the start and end ranges of a page default back to their original values.

You can view the range in either half of the screen. In the top half, it's represented by the two numbers labeled "Range." In the bottom half, use those two mysterious cursors. Move the first cursor to the position desired for the start and the second to that desired for the end of range, then press the appropriate key. The **disk commands** are:

Set start of range. Press the + key. Bot-

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tom window only. Marks where you want to start saving your characters.

Set end of range. Press the – key. Bottom window only. This marks the stop position for a save.

Save data. Press S. The screen will clear, turn color and request a filename. Make sure a formatted work disk is in the drive, enter a filename and press return. If you try to save your character graphics with a filename that exists, the program will ask if you want to replace that file. If you answer Y, it scratches the old file and saves the new one.

Load data. Press L. The screen will clear, turn light blue and request a filename. Enter the filename and press return. Be aware that Overkill makes no provision as to the load address—which means that the file will load into another application at the default memory from which it was saved.

When you are entering the filename for a load or save, you can press run/stop to abort the operation and return to the Main menu.

After you use the Load or Save command, several pointers will default to their original values. They are: color RAM, both start and end of range, mode, and current page. If you loaded data into Overkill using the Load function, just change pages to find your character graphics.

Final Tips & Reminders

Overkill resides in memory from location 16384 to 20889 and uses locations 28672 to 30720 for variables. Consequently, you could use other machine language utilities at the same time, since these areas of memory are rarely occupied. Be aware, however, that a long Basic program could cut into Overkill, so be careful when running multiple programming utilities.

As a programming trick, you could use a small Basic program with Overkill to test your characters in action. To reactivate Overkill from Basic, just enter SYS 16384.

Remember that you must use control register 53272 to actually use your character set. Also, if you plan to use multicolor characters, you must use register 53270. When using multicolor characters, be sure to use registers 53282 and 53283, poking these with the colors you want. And finally, to load your character graphics data into memory, remember to enter LOAD "NAME",8,1. R

Rocco Saya is a freelance writer and programmer who is "still impressed with the flexibility of the C-64." He is currently programming a science-fiction action adventure.

Listing 1. Overkill boot program. (Also available on the March/April ReRUN disk. To order call 1-800/343-0728.)

```
5 REM OVERKILL.ML BOOT PROGRAM                    :REM*101
                              :REM*206
10 IF Z=0 THEN 30             :REM*237
20 SYS 16384                  :REM*214
30 POKE53280,0:POKE53281,0:PRIN
   TCHR$(147)                 :REM*232
40 PRINTSPC(6)CHR$(144)"OVERKIL
   L V1.0 BY ROCCO SAYA":PRINT
50 PRINT SPC(12)"IS NOW LOADING
   "                          :REM*189
60 FORT=0TO17:READX:POKE49152+T
   ,X:NEXT                    :REM*54
70 FORP=1TO8:READC:POKE780,C:SY
   S49152:FORL=1TO100:NEXT:NEXT
   :Z=1                       :REM*93
80 LOAD "OVERKILL.ML",8,1
                                          :REM*66
90 DATA 162,0,157,0,216,157,0,2
   17,157,0,218,157,0,219,232,2
   08,241,96                  :REM*133
100 DATA 0,11,12,15,15,12,11,6
                              :REM*88
```

Listing 2. Overkill main program. (Available on the March/April ReRUN disk.)

```
0 REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) OVERKIL
  L.ML                        :REM*21
5 OPEN 8,8,8,"OVERKILL.ML,P,W"
                              :REM*139
6 CT=0:PRINT"{SHFT CLR}":REM*56
10 READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                          :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1            :REM*141
15 IF LEN(A$)<62 THEN 55
                              :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)         :REM*242
25 FOR I=1 TO 30              :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                              :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*67
50 NEXT:GOTO 10               :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                       :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70                 :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                              :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                              :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55                  :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55                  :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                              :REM*148
95 NEXT:GOTO 10               :REM*160
100 REM HEX DATA FOR OVERKILL
                              :REM*36
101 DATA 0040204B5120 4B4420 2F*4
    D204B4620 2A4620 3946*206B46A
    94D205740A950             :REM*155
102 DATA 205740A91D205740A900*8
    D3C78A9FF8D3D7820E5*4EA9018
    DFE78207045AD             :REM*94
103 DATA FE78ADB4411869028D27*D
    0690 18D28D069018D29*D0ADFE7
    8F0AC4C3140 8D            :REM*196
104 DATA 3A7820 76456 0AD14788D*3
    F7860AD14788DFF7860*A94985F
    EA9CA85FDA200             :REM*139
105 DATA 8AA8B19B858BA000 8A18*6
    905AABDF0EC850585B2*B5D9290
    7850 61869D485            :REM*176
106 DATA B38A38E905AAADB4418D*3
    F788DFF78A58B31FDF0*1020 5E4
    0C8A58B31FDF0             :REM*133
107 DATA 3E2065404C0A41C8A58B*3
    1FDF04AAD0F78F00620*65404C0
    A41AD3278F015             :REM*133
108 DATA 4CE240 88A58B51FD858B*C
    8A58B51FD858B6020D3*40AD22D
    08D3F788DFF78             :REM*231
109 DATA 4C0A41AD0F78D014AD32*7
    8F00320D340AD23D08D*3F788DF
    F784C0A418898             :REM*242
110 DATA 18690AA8A58C9105AD3F*7
    891B2C8ADFF7891B2A5*8C91053
    898E90AA8C8C0             :REM*97
111 DATA 08F00 34C9A40AD3278F0*0
    68AA8A58B919BE8E008*F00 34C7
    6406 0A00 8A200           :REM*30
112 DATA BDB9419DAF41E888D0F6*7
    8A9748D1403A9418D15*038D12D
    0A91B8D11D0A9             :REM*63
113 DATA 018D1AD08D0DDCA900 8D*4
    078586 0AD19D08D19D0*2901F02
    8CE4078100 5A9            :REM*78
114 DATA 018D4078AE4078BDAF41*8 ►
```

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```
    D18DØBDB1418D16DØBD*B3418D2
    1DØBDB5418D12          :REM*4Ø
115 DATA DØ8AFØØ668A868AA684Ø*4
    C31EA1519C8D8Ø2ØØ9B*ØØD8C81
    519C8D8Ø2ØØ9B          :REM*25
116 DATA ØØ53415645ØD92ØØ4C4F*4
    144ØD92ØØ9Ø454E5445*522Ø464
    94C454E414D45          :REM*8
117 DATA 2Ø3A2ØØØD4E4F572Ø4C*4
    F4144494E472ØØ5ØØØD*9E4F2E4
    B2EØDØDØØ9E45          :REM*1Ø2
118 DATA 52524F522C2Ø43484543*4
    B2Ø44524956452Ø262Ø*4449534
    BØØØ55Ø524553          :REM*223
119 DATA 532Ø535Ø4143452Ø544F*2
    Ø434F4E54494E5545ØØ*ØD4E4F5
    72Ø534156494E          :REM*122
12Ø DATA 472ØØ5ØØA9Ø68D86Ø2A9*Ø
    E8DB3418DB4418D2ØDØ*8D4278A
    9ØØ8D15DØ2Ø65          :REM*122
121 DATA 422ØA642DØØ6A9ØØ8DFE*7
    86Ø4CBA42A9932ØD2FF*A9122ØD
    2FFA228A92Ø2Ø          :REM*17Ø
122 DATA D2FFCADØFAA9158DBØ41*1
    8AØ1ØA2ØØ2ØFØFFAD42*78DØØAA
    Ø41A9C12Ø1EAB          :REM*55
123 DATA 4C9C42AØ41A9C82Ø1EAB*A
    Ø41A9CF2Ø1EABA2ØØ6Ø*2Ø765ØD
    ØØ16ØAE3378A9          :REM*159
124 DATA ØØ9D44788E4178A9Ø16Ø*A
    9ØD2ØD2FFA9Ø18D86Ø2*AD4278D
    ØØAAØ42A92E2Ø          :REM*254
125 DATA 1EAB4CDA42AØ41A9E22Ø*1
    EABAØ78A9442Ø1EABAØ*Ø1A9Ø1A
    2Ø82ØBAFFAD41          :REM*148
126 DATA 78A244AØ782ØBDFFA9ØØ*8
    59DAD4278DØØEA99BAE*1878AC1
    9782ØD8FF4C1Ø          :REM*25
127 DATA 43A9ØØ2ØD5FFA9Ø68D86*Ø
    2A59ØFØ35C94ØFØ312Ø*3F45AD7
    278C936FØØ34C          :REM*241
128 DATA 3143AD7378C933FØ1A18*A
    2Ø3AØØ72ØFØFFAØ41A9*FA2Ø1EA
    B18A2Ø5AØØ72Ø          :REM*69
129 DATA FØFF4C55434CFB5ØAØ41*A
    9F12Ø1EABAØ42A9152Ø*1EAB2ØE
    4FFFØFB4CØØ4Ø          :REM*15
13Ø DATA 6ØA9ØØ8D4278A9ØA8DB3*4
    18DB4418D2ØDØA9Ø28D*86Ø2A9Ø
    18D3578AD3D78          :REM*34
131 DATA 2ØDD482ØF14818A59B69*Ø
    98D1878A59C69ØØ8D19*78AD3C7
    82ØDD482ØF148          :REM*18
132 DATA 4C4F42A12Ø2Ø2Ø2Ø2Ø2Ø*2
    Ø2ØB62Ø2Ø2Ø2Ø2Ø2Ø2Ø*2ØB52Ø2
    Ø2Ø2Ø2Ø2Ø2Ø2Ø           :REM*2Ø2
133 DATA 2Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø2Ø*2
    Ø2ØB6ØØ9Ø574F524B49*4E471D9
    Ø4F5645524B49          :REM*124
134 DATA 4C4C1D9Ø4D4F4445 2Ø3A*Ø
    Ø4F4E1D1D1D1D96AFAF*AFAFAFA
    FAFAFØØ9Ø4255          :REM*52
135 DATA 46464552ØØ4D554C5449*2
    Ø312Ø2Ø3A4D554C4954*2Ø322Ø2
    Ø3A434F4C4F52          :REM*37
136 DATA 2Ø52414D3A4241434B52*4
    F554E443A5Ø4147452Ø*3A2Ø2Ø2
    Ø2Ø52414E4745          :REM*77
137 DATA 3A2Ø2Ø2Ø2Ø9Ø42592Ø9B*5
    24F43434F2Ø53415941*ØØ2Ø444
    1A9932ØD2FFA9          :REM*1Ø6
138 DATA ØØ8D2ØDØ4C7A44A9132Ø*D
    2FFA9122ØD2FFA9962Ø*D2FFA25
    ØA92Ø2ØD2FFCA          :REM*2Ø6
139 DATA DØFAA9922ØD2FF6Ø2Ø5B*4
    4A9ØB8D4378AØ43A9A3*2Ø1EABC
    E4378DØF4A228          :REM*113
14Ø DATA A9B82ØD2FFCADØFA18A2*Ø
    3AØØ22ØFØFFAØ43A9CC*2Ø1EAB1
    8A2Ø4AØØ42ØFØ          :REM*227
141 DATA FFAØ43A9E72Ø1EAB18A2*Ø
    8AØØ22ØFØFFAØ43A9F7*2Ø1EABA
    9Ø58D4378A2ØØ          :REM*98
142 DATA 8E427818AE4378AØ132Ø*F
    ØFFAE4278AØØABDFF43*2ØD2FFE
    888DØF68E4278          :REM*72
143 DATA EE4378AD4378C9ØBFØØ3*4
    CCF4418AØ13A2ØB2ØFØ*FFA93BA
    Ø442Ø1EABA2ØØ          :REM*184
144 DATA AØØØ8A9D8ØØ6A9Ø19D8Ø*D
    AE888DØF3A9AØ8DE5Ø4*8DØDØ58
    D35Ø58D5DØ5AD          :REM*121
145 DATA 12788DE5D8AD13788DØD*D
    9AD14788D35D9ADB441*8D5DD96
    Ø4ØA9932ØD2FF          :REM*241
146 DATA A9Ø52ØD2FF18A2Ø1AØØ7*2
    ØFØFFA9Ø82ØB4FFA96F*85B92Ø9
    6FFA2ØØ2ØA5FF          :REM*8
147 DATA 9D72782Ø16E7E8C9ØDDØ*F
    24CABFF2ØE4FF8D3A78*A9Ø78D8
    6Ø2A9ØØ8D3578          :REM*122
148 DATA AD3A78C991FØ5FC911FØ*5
    EC99DFØ6ØC91DFØ59C9*89FØ5EC
    98AFØ5DC98BFØ          :REM*114
149 DATA 5CC98CFØ64C985FØ7AC9*4
    DFØ5FC95FFØ61C993FØ*6AC952F
    Ø62C949FØ49C9          :REM*68
15Ø DATA 4FFØ4EC946FØ3EC93EFØ*3
    7C9D2FØ27C95ØFØ142Ø*5C4EADØ
    F78DØØ44C7C4C          :REM*171
151 DATA 6ØAD3A78C92ØFØ426Ø4C*7
    44D4C44474C5A474C93*474C7Ø4
    74C684C4C2746          :REM*74
152 DATA 4C36464C45464CØA4C4C*E
    44B4CB74B4C68464CA7*464CD44
    BAD367849Ø18D          :REM*54
153 DATA 36786Ø2ØØ64B6Ø2ØEC4A*6
    Ø4CFB464CDC49EE1278*AD12788
    DE5D88D22DØ4C          :REM*72
154 DATA 7446EE1378AD13788DØD*D
    98D23DØ4C7446EE1478*AD1478C
    9Ø89ØØAADØF78          :REM*43
155 DATA DØØ5A9ØØ8D1478AD1478*8
    D35D98D11782ØB7464C*7446EEB
    441ADB4418D5D          :REM*153
156 DATA D98D1578A2Ø58E187818*A
    E1878AØ1F2ØFØFF388A*E9Ø5AAB
    D127829ØFAAA9          :REM*6Ø
157 DATA ØØ2ØCDBDA92Ø2ØD2FFEE*1
    878AD1878C9Ø9FØØ34C*79464C5
    A4BADØE78FØ41          :REM*1Ø5
158 DATA ADØF7849Ø18DØF782ØCA*4
    AADØF78FØØCAD14788D*11782ØE
    E464CE446AD14          :REM*49
159 DATA 78C9Ø89ØØC38E9Ø88D14*7
    88D35D94CC8461869Ø8*8D11782
    ØEE462Ø9F4A2Ø          :REM*89
16Ø DATA 74464C2E486ØADØE78FØ*Ø
    7AD11788DØ5786Ø6Ø2Ø*D249ADØ
    E7849Ø18DØE78          :REM*224
161 DATA ADØE78FØ16AD16788DØØ*7
    8AD17788DØ178A9FF8D*15DØA9A
    Ø4CE247ADØØ78          :REM*155
162 DATA 8D1678ADØ1788D1778A9*Ø
    A8DØØ78A9Ø58DØ178A9*ØØ8D15D
    ØA9AØ2Ø2E484C          :REM*213
163 DATA E247A9Ø18D1878AD3678*F
    ØØ34C6F4B2ØD249CEØ1*784CCC4
    7A9Ø18D1878AD          :REM*223
164 DATA 3678FØØ34C8C4B2ØD249*E
    EØ1784CCC47A9ØØ8D18*78AD367
    8FØØ34C294B2Ø          :REM*67
165 DATA D249CEØØ78ADØF78DØØ8*A
    DØE78DØØ3CEØØ784CCC*47A9ØØ8
    D1878AD3678FØ          :REM*47
166 DATA Ø34C5D4B2ØD249EEØØ78*A
    DØF78DØØ8ADØE78DØØ3*EEØØ784
    CCC47AEØ178B5          :REM*11
167 DATA D929Ø785Ø41869D485Ø6*B
    DFØEC85Ø385Ø56ØADØE*78FØØEA
    D1878FØØ32Ø7B          :REM*128
168 DATA 492Ø68494CE2472Ø2F49*2
    ØB647ACØØ78ADØE78DØ*Ø8B1Ø38
    D34784CFD47B1          :REM*144
169 DATA Ø38DØ2788D3478B1Ø58D*Ø
    5784C1Ø48ACØØ7891Ø3*ADØ5789
    1Ø56ØADØE78FØ          :REM*174
17Ø DATA Ø62ØA24C4C2848A9AØ2Ø*Ø
    548ADB441AAE88A91Ø5*ADØE78D
    ØØ16ØA9Ø68D32          :REM*13
171 DATA 78A9ØE8D3378A9Ø78D3B*7
    82Ø41486ØADØØ788DØ3*78ADØ17
    88DØ478A9Ø28D          :REM*188
172 DATA ØØ78AD32788DØ1782Ø72*4
    8A9ØE8DØ178AD33788D*ØØ78AD1
    4788D3B782Ø72          :REM*2Ø2
173 DATA 484CD4482ØB647ADØ278*A
    CØØ7891Ø3A5Ø469D485*Ø6A5Ø38
    5Ø5ADØ178C9ØE          :REM*67
174 DATA 9ØØEADØF78DØØ918AD3B*7
    869Ø84C9F48AD3B7891*Ø5ADØ37
    88DØØ78ADØ478          :REM*179
175 DATA 8DØ1784CBA4818AE3278*A
    ØØ62ØFØFF6Ø2ØBØ48A9*2Ø2ØD2F
    F2ØD2FF2ØD2FF          :REM*228
176 DATA 2ØBØ48A9ØØAEØ2782ØCD*B
    D6ØADØ2782ØDD484CF1*488DØ67
    8A9ØØ8DØ778A2          :REM*7
177 DATA Ø3ØEØ6782EØ778CADØF7*6
    Ø18ADØ6786D39788DØ8*78ADØ77
    86D38788DØ978          :REM*31
178 DATA ADØ878859B85Ø3ADØ978*8
    59C85Ø4AD3578FØØ16Ø*A9CF858
    CA9ØØ8D32782Ø          :REM*23Ø
179 DATA 6C4ØADØ3785Ø5ADØ478*8
    5Ø66ØADØØ78C9ØA9Ø1Ø*C912BØ1
    CADØ178C9Ø4FØ          :REM*216
18Ø DATA 1BC9ØDFØ1D6ØA9118DØØ*7
    8ADØF78DØØ5A91Ø8DØØ*786ØA9Ø
    A8DØØ786ØA9ØC          :REM*98
181 DATA 8DØ1786ØA9Ø58DØ1786Ø*A
    DØ178C916FØ37ADØØ78*C928FØ1
    8C9FFFØ1A6ØAD          :REM*143
182 DATA ØØ78C91ØBØ36ADØ178C9*Ø
    FFØ11C917FØ136ØA9ØØ*8DØØ786
    ØA9278DØØ786Ø          :REM*24Ø
183 DATA A9168DØ1786ØA91Ø8DØ1*7
```

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    86ØADØØ78C9FFFØØ5C9*1ØFØDD6
    ØA9ØF8DØØ786Ø          :REM*227
184 DATA ADØ178C916FØE1C9ØFFØ*Ø
    16ØA9158DØ1786Ø8Ø4Ø*2Ø1ØØ8Ø
    4Ø2Ø12ØB647AD          :REM*21Ø
185 DATA 34782ØØ5486ØADØE78FØ*Ø
    16Ø38ADØØ78E9ØAAABD*CA498DF
    949ADØ17838E9          :REM*7Ø
186 DATA Ø5A8B19B49ØØ919B2Ø2E*4
    84CE24738ADØØ78E9ØA*AABDCA4
    98D3E4AE8BDCA          :REM*128
187 DATA 498D624AADØ17838E9Ø5*A
    8AD3D4AC9Ø9FØ17AD3E*4A8D2D4
    AB19B29ØØ8D32          :REM*129
188 DATA 78B19BED3278919B4C41*4
    AB19BØØØØ919BAD614A*C9Ø9FØ1
    7AD624A8D514A          :REM*131
189 DATA B19B29ØØ8D3278B19BED*3
    278919B4C654AB19BØØ*ØØ919B2
    Ø2E484CE247A9          :REM*22Ø
19Ø DATA 298D3D4AA9Ø98D614A4C*Ø
    24AA9Ø98D3D4AA9Ø98D*614A4CØ
    24AA9Ø98D3D4A          :REM*8Ø
191 DATA A9298D614A4CØ24AA929*8
    D3D4AA9298D614A4CØ2*4AA2ØØA
    D11789D3ØDAE8          :REM*152
192 DATA DØF7AD11789DØØDBE8DØ*F
    76ØØØØA4D554C544943*4F4C4F5
    2484952455320          :REM*123
193 DATA 2Ø2Ø2Ø2Ø18AØ1AA2Ø32Ø*F
    ØFFAEØF78BDB7418DB2*41BDB44
    AAAAØØABDB64A          :REM*2Ø6
194 DATA 2ØD2FFE888DØF66ØA2Ø8*A
    ØØØA9ØØ919BC8CADØFA*ADØE78F
    ØØ34C2E482Ø2E          :REM*37
195 DATA 484CE247AØØØA2ØØBDCA*4
    98D134BB19B49ØØ919B*E8EØØ8F
    ØØ34CØA4BC8CØ          :REM*76
196 DATA Ø8FØØ34CØ84B4CF84AA9*Ø
    A8D464BA98Ø8D1878A9*Ø18D197
    8AØØØA2Ø8B19B          :REM*1Ø2
197 DATA 2D18788D1Ø78B19BØA18*9
    19BAD1Ø78FØØ7B19BØD*1978919
    BC8CADØE24CF8          :REM*127
198 DATA 4AA9Ø18D1878A98Ø8D19*7
    8A94A8D464B4C384BAØ*ØØA2Ø8B
    19B8D1878C8B1          :REM*222
199 DATA 9B88919BC8CADØF6AØØ7*A
    D1878919B4CF84AAØØ7*A2Ø8B19
    B8D1878AØØØB1          :REM*241
2ØØ DATA 9B992Ø78C8CADØF7AØØØ*A
    2Ø7B92Ø78C8919BCADØ*F7AØØØA
    D1878919B4CF8          :REM*133
2Ø1 DATA 4AAØØØA2Ø8B19B992978*C
    8CADØF7A9ØA8D3278A9*Ø28D337
    82Ø38484CF84A          :REM*15Ø
2Ø2 DATA AØØØA2Ø8B92978919BC8*C
    ADØF74CC44B2ØEA4B4C*F84AAØØ
    ØA2Ø8B19B992Ø          :REM*144
2Ø3 DATA 78C8CADØF7AØØØA2Ø7BD*2
    Ø78919BC8CAEØFFFØØ3*4CFB4B6
    Ø2Ø1Ø4C4CF84A          :REM*158
2Ø4 DATA AØØØ8C3378A2Ø8A9ØØ99*2
    Ø78C8CADØF9A2Ø7AØØØ*B9CA498
    D364C8C3278AC          :REM*86
2Ø5 DATA 3378B19BAC32782ØØFØ*Ø
    EBDCA498D434CB92Ø78*Ø9ØØ992
    Ø78C8CØØ8FØØ3          :REM*12Ø
2Ø6 DATA 4C244CCAEE3378EØFFFØ*Ø
    34C224CA2Ø8AØØØB92Ø*78919BC
    8CADØF76Ø2Ø1Ø          :REM*42
2Ø7 DATA 4C2Ø1Ø4C2ØE44BA9Ø18D*3
    2782Ø6C4Ø4CF84AADØE*78FØØ16
    ØAD3A78C931FØ          :REM*191
2Ø8 DATA ØDC932FØØCC933FØØBC9*3
    ØFØØA6Ø4C6B4A4C854A*4C784A4
    C924AA9Ø18D3E          :REM*31
2Ø9 DATA 782ØB74CAD19788DØ1DØ*A
    D32788DØØDØ6Ø38A9FF*ED3E788
    D1878ADØ1782Ø          :REM*1ØØ
21Ø DATA DD4818ADØ678692C8D19*7
    8ADØØ78C91EBØ162ØDD*4818ADØ
    67869118D3278          :REM*155
211 DATA AD1ØDØ2D18788D1ØDØ6Ø*A
    DØØ788D337838ADØØ78*E91F8DØ
    Ø782ØDD4818AD          :REM*249
212 DATA Ø67869Ø98D3278AD1ØDØ*Ø
    D3E788D1ØDØAD33788D*ØØ786ØØ
    Ø1ØØØØØØØ1ØØ          :REM*156
213 DATA ØØØØØØØØØØØØØØØ1ØØØØ*Ø
    ØFØF2Ø1ØØØØ1ØA218AØ*ØØB9174
    D99ØØ78C8CADØ          :REM*152
214 DATA F6A232A9ØØ99ØØ78C8CA*D
    ØF7AD22DØ8D1278AD23*DØ8D137
    8A9Ø18D1478A9          :REM*143
215 DATA FF8D15DØA9ØE8DF8Ø78D*F
    9Ø78DFAØ7A92Ø8D3878*A9ØØ8D3
    9786Ø18AØ18A2          :REM*115
216 DATA Ø92ØFØFFAD3878C938FØ*2
    FAD38781869Ø88D3878*EEBØ41E
    EBØ4118A2Ø9AØ          :REM*221
217 DATA 1D2ØFØFFA92Ø2ØD2FFA2*Ø
    9AØ19182ØFØFFAD3878*A2ØØ2ØC
    DBD4C2E48A92Ø          :REM*229
218 DATA 8D3878A9198DBØ414C92*4
    D9E12415245 2Ø594F55*2Ø53555
    2452Ø28592F4E          :REM*126
219 DATA 29ØØAE3978AC38782ØF5*4
    FA2ØØAØDØ2ØFA4F18AØ*Ø1A2Ø12
    ØFØFFAØ4DA9BF          :REM*16
22Ø DATA 2Ø1EAB2ØE4FFFØFBC959*F
    ØØAC94EFØØ34CF34D4C*5Ø4E78A
    97F8DØDDCA5Ø1          :REM*242
221 DATA 29FB85Ø1A2Ø8AØØØAD18*7
    8FØØ9C9Ø2FØØ5A9ØØ4C*264EB1F
    D91FBC8CØØ8FØ          :REM*252
222 DATA Ø7CØØØFØØD4C164EAD18*7
    8C9Ø2FØØA4C164EE6FE*E6FCCAD
    ØCFA5Ø1Ø9Ø485          :REM*158
223 DATA Ø1A98Ø8DØDDC2Ø5B44A9*9
    E2ØD2FF584CF84AAD3A*78C987F
    Ø47C94CFØ29C9          :REM*195
224 DATA 53FØ28C944FØ27C9C9FØ*2
    6C9CFFØ25C988FØ24C9*86FØ23A
    DØE78FØØBAD3A          :REM*242
225 DATA 78C92BFØ22C92DFØ376Ø*4
    C3C424C65434CAE4F4C*185Ø4C2
    B5Ø4C385Ø4C43          :REM*65
226 DATA 5Ø2Ø544F2ØØØ4CD44DAD*Ø
    2788D3C78AD3C78CD3D*78BØØ34
    CE54EAAE88E3D          :REM*21
227 DATA 784CE54EADØ2788D3D78*2
    ØD24E4CE54EAD3D78CD*3C78FØØ
    39ØØ16ØAE3C78          :REM*91
228 DATA E88E3D786ØAD3C78C9FF*F
    ØØ34CF94EA9ØØ8D3C78*A9Ø18D3
    D7818A2ØAAØ19          :REM*153
229 DATA 2ØFØFFA2ØAA92Ø2ØD2FF*C
    ADØFA18A2ØAAØ192ØFØ*FFA9ØØA
    E3C782ØCDBDA9          :REM*2Ø3
23Ø DATA A5AØ4E2Ø1EABA9ØØAE3D*7
    82ØCDBDADØØ788D2Ø78*ADØ1788
    D2178ADØ2788D          :REM*226
231 DATA 1978AD3C788DØ2782Ø95*4
    FAD19788DØ278A9Ø28D*3E782ØB
    74CAD19788DØ3          :REM*21Ø
232 DATA DØAD32788DØ2DØADØ278*8
    D1978AD3D788DØ2782Ø*954FAD1
    9788DØ278A9Ø4          :REM*28
233 DATA 8D3E782ØB74CAD19788D*Ø
    5DØAD32788DØ4DØAD2Ø*788DØØ7
    8AD21788DØ178          :REM*3
234 DATA 6ØA91Ø8DØ178ADØ278C9*2
    89ØØ938E928EEØ1784C*9D4F8DØ
    Ø786ØADØE78DØ          :REM*63
235 DATA Ø16ØA92Ø858CA9ØØ8D32*7
    82Ø6C4ØA9Ø58D1878A9*ØA8D197
    8A9Ø52ØD2FF18          :REM*176
236 DATA AE1878AC19782ØFØFF38*8
    AA8E9Ø5A8B19BAAA9ØØ*2ØCDBDE
    E1878AD1878C9          :REM*53
237 DATA ØDFØØ34CCA4F6Ø86FB84*F
    C6Ø86FD84FECØFØBØØ6*A9ØØ8D1
    8786ØA9Ø18D18          :REM*172
238 DATA 786ØAE3978AC38782ØF5*4
    F6ØAE3978AC38782ØFA*4FA2ØØA
    Ø7Ø2ØF54F4CE4          :REM*4Ø
239 DATA 4DA2ØØAØ7Ø2ØFA4F2ØØE*5
    Ø4CE44DAØF12ØFA4F2Ø*ØE5Ø4CE
    44D38ADØ878ED          :REM*148
24Ø DATA 39788D3278ADØ978ED38*7
    88D3378AEØ878ACØ978*2ØF54FA
    9Ø28D187818A9          :REM*84
241 DATA ØØ6D327885FDA9DØ6D33*7
    885FE4CØ64EA9ØØ8D33*78A9A42
    ØD2FF2ØEDF6DØ          :REM*231
242 DATA Ø16Ø2ØE4FFC914FØ4ØC9*Ø
    DFØ59C922FØEBC92Ø9Ø*E7C9AØ9
    Ø298D3A78AD33          :REM*64
243 DATA 78C91Ø9ØØ34C8Ø5ØA99D*2
    ØD2FFAD3A782ØD2FFAE*33789D4
    478EE3378A9A4          :REM*59
244 DATA 2ØD2FF4C8Ø5ØC98ØBØB6*4
    C9D5ØAD3378FØAEA99D*2ØD2FFA
    92Ø2ØD2FFA99D          :REM*151
245 DATA 2ØD2FF2ØD2FFCE33784C*7
    B5ØA9Ø16Ø9E5245 5Ø4C*4143452
    Ø592F4EØ5ØØ18          :REM*227
246 DATA A2Ø3AØØ72ØFØFFA9EDAØ*5
    Ø2Ø1EAB2ØE4FFC959FØ*ØAC94EF
    ØØ34CØA514CØØ          :REM*91
247 DATA 4ØA9Ø82ØB1FFA96F85B9*2
    Ø93FFA9532ØA8FFA93Ø*2ØA8FFA
    93A2ØA8FFAC41          :REM*81
248 DATA 78A2ØØBD44782ØA8FFE8*8
    8DØF62ØAEFF4C6242A2*ØØAØ4ØB
    D5A519D8ØØ3E8          :REM*25Ø
249 DATA 88DØF66ØØØØØØØØØØØØ*Ø
    ØØØØØØØØØØØ1FEØØØ3*FFØØØ6Ø
    18ØØ6Ø18ØØ6Ø1          :REM*56
25Ø DATA 8ØØ6Ø18ØØ6Ø18ØØ6Ø18Ø*Ø
    6Ø18ØØ6Ø18ØØ3FFØØØ1*FEØØØØØ
    ØØØØØØØØØØØØ          :REM*126
251 DATA ØØØØØØØØØØØØØØØØ
                           :REM*227
252 DATA -1                :REM*11Ø
```

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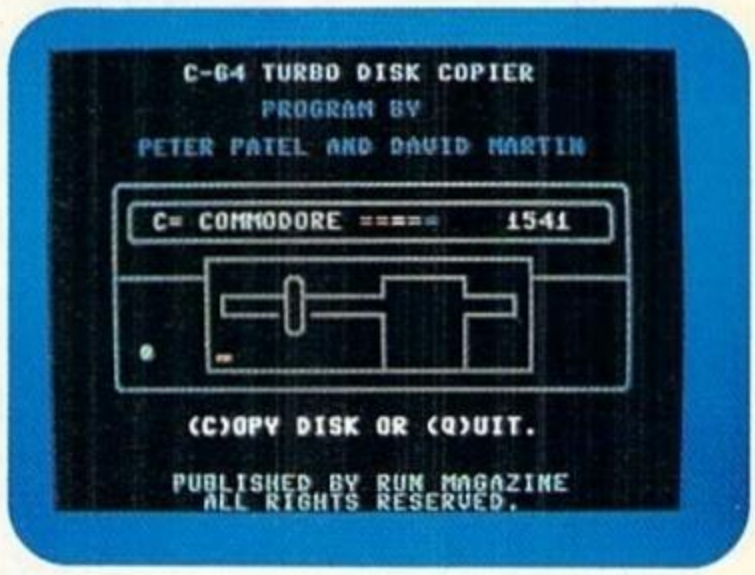

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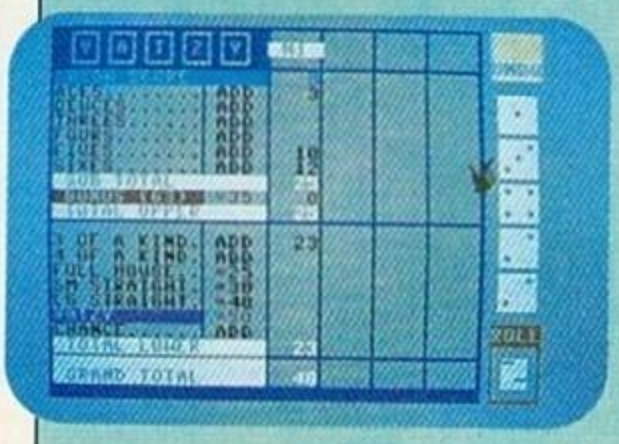

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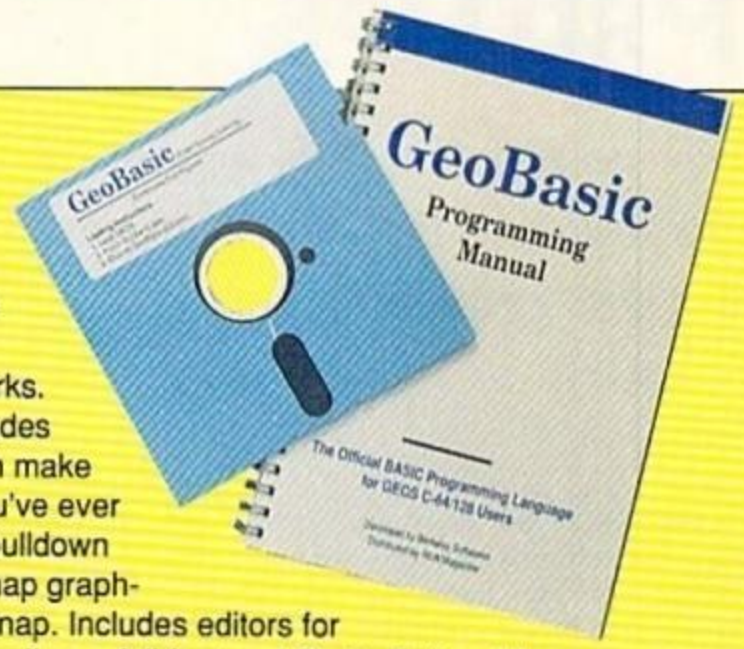

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ProTips

Discover how to take the aggravation out of booting GEOS, making labels and spell-checking your documents.

By JANICE GREAVES

Superscript 64: Word processors that can total columns and rows are handy at tax time for preparing state income tax forms. There are commercial software packages available for preparing federal tax forms, but not for preparing state forms. In many states, you can use the numbers from your federal form to prepare your state form. I have found that word processors prepare tax returns more quickly and easily than spreadsheets, so here are some tips for preparing your state tax form using your federal numbers and Superscript 64:

Put the tax form line numbers down the left of the page.

Set two columns for numbers: one for exemptions, the other for dollar amounts.

Set text width over 60 (f1 s w 66). Set left margin at 1 and right margin at 80 ({CONTROL L} lm1:rm80 {RETURN}).

Set numeric tabs at columns 35 and 45 (f1 t n, with cursor at the column you want. This leaves room for a few words.)

Set decimal places to zero, since you will want your figures rounded to whole dollars.

Prepare the lines with the federal numbers in them first, to make it easier.

Be certain to put a minus sign in front of numbers that are to be subtracted.

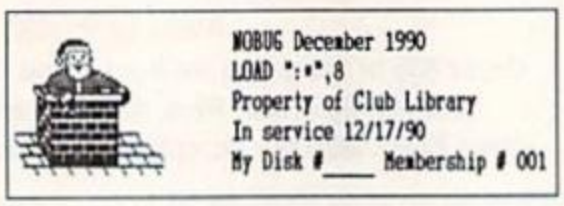
When you come to a line on your tax form that tells you to add or subtract, put a line of hyphens under the last amount to be totalled, press return and tab back to the dollar column to get your total with the calculator (f1 c c).

You can put percentages and formulas in the document, then use the document calculator to put the result on the line where you do the figuring, and again in the location where you have to transfer it (with f1 c r).

The manual is very helpful if all of this is unfamiliar. See the sections on Wide Screen Editing (pp. M–4 to M–8) and the Calculator (pp. R–87 to R–92).

—Joost Vas Dias
Hubert, NC

Fontmaster 128: As newsletter editor and disk-of-the-month producer for two user groups, I've been using Fontmaster 128 v1.2 for several years. I personalize the monthly disk labels by treating them like form letters. To make labels for each of the 60 members, I create a file with the picture and general information, and then create a sequential file with the personal information, such as name and membership number. This way, all I need to change each month is the picture, the month and the in-service date.



Personalized disk labels with Fontmaster.

My standard file appears on the screen as follows (↵ = return, ← = back arrow):

ESC pl6:lm1:rm35:tm0:bm0:ls7 ↵
Select font ↵
ESC id1:{picture}ESC{2 CTRL spcs} {condensed} NOBUG December 1990 ↵
{4 CTRL spcs} LOAD":*",8 ↵
{4 CTRL spcs} Property of ← ↵
{4 CTRL spcs} In service 12/17/90 ↵
{4 CTRL spcs} My Disk # _ _ _ _
Membership # ← ↵

This file allows me to print labels like the sample above. (NOBUG is an acronym for NOrth Baltimore Users Group.)

—Warren Eckhart
Baltimore, MD

Word Writer 128: Commodore users with 1571 or 1581 drives will find the dictionary feature much easier to use if they make a special working copy of the disk. This version of Word Writer is not copy-protected, so you can copy the program modules and the dictionary to one double-sided disk.

The program disk can be configured to use the dictionary located on drive #8. Use any auto-bootmaker program to create an auto-boot sector before copying the files. Use "WW" as the boot file and specify it as binary. Unfortunately, this will not work with Thesaurus files, since they are copy protected.

—Peter Fiorentino
Jamaica, NY

GEOS: To load GEOS with some parallel printer interfaces connected to the serial bus of C-64 and 128 computers, you have to disconnect a hot wire connector leading from the Datassette port and/or a serial din connector that leads to the computer or disk drives.

I solved the problem by cutting the hot wire from the PPI that goes to the Datassette and installing a $2.50 toggle switch in the line.

With this device, I can turn the printer on, toggle the switch to Off and boot up the software. After running the program, I toggle the switch to On and everything is ready . . . without turning the power off and disconnecting lots of cables.

—John Tomassetti
Wooster, OH

Word Writer 128: Using the Shift/Insert-Delete key to insert text into a document frequently results in wider margins or unexplained blank lines during printing. This is easily corrected by using the Formatting Text option before printing.

With the cursor placed anywhere within a paragraph, press Commodore F, then press P at the "Format All or Paragraph" prompt. Pressing A may result in undesired text movement, so make sure you save your document before using this option.

—Glen Young
Renton, WA ■

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128 Mode

RUN readers are in for a musical treat with this short, but noteworthy, pitch memorization program.

By MARK JORDAN

A RECENT VISIT with my family to the Chicago Museum of Science and Industry planted a new programming idea in my head. In the Sound exhibit we had a lot of fun playing with a machine that measured our ability to memorize and then match an audio pitch.

The process was simple. Wearing earphones, we listened to a tone for a few seconds. Then it stopped and we heard a new tone at a different pitch. Our object was to turn a knob that raised and lowered the second pitch until it matched the first. When we had the second tone just the way we remembered the first, we pressed a button to see how close we came. It was fun—especially when we were correct!

I remember playing with this same machine over a decade ago, but a decade ago I knew nothing about computers, oscillators or the Sound statement, and little about pitch frequencies. After this visit, it struck me how simple it would be to program this sort of pitch-memory device for the C-128.

The Program

The following program listing, Pitch-Memorizer, is the result. It's very short—a slow typist should be able to type it in in less than half an hour. Pitch-Memorizer is almost as easy to use as the machine at the museum, although you will control the pitch by pressing keys rather than by twisting a knob.

The number 4 and 5 keys both raise the pitch. The 4 key raises the pitch in large steps while the 5 key moves it in small increments for fine-tuning. Number keys 1 and 2 are similar; the 1 key lowers the pitch in large steps, the 2 key in small increments. This lets you move quickly to the approximate pitch zone with the 1 and 4 keys, then fine-tune with the 5 and 2 keys. When you think your tone matches the first, press return to see how well you remembered.

You will enjoy testing your pitch memory with this program, but that's not the only reason I presented it this month. I also wanted to illustrate the value of keeping your programs small. Pitch-Memorizer, a 32-liner, was neither time-consuming nor difficult. It took less than two hours to write. With the C-128 Sound statement, programming the sounds was a snap, even if a tad crude. CHAR, GETKEY and DO/LOOP are other C-128 features that saved time and frustration.

I'm a strong believer in short programs. By keeping the program simple, I enjoyed writing it as much as using it. Pitch-Memorizer is short enough that I didn't even need to preplan it or add comments for future reference. I just began at the top and wrote it. Done. *Al Fin.* What's more, the main structure of the program is complete, so it will be easy to modify. I envision a refined, animated future version with more precise controls, more options and more tests.

Use your imagination the next time you go to a museum or to a ball game: ideas for programs are everywhere. R

Mark Jordan, who teaches high school English, has been in Commodore Programming mode during his spare time for many years.

Listing 1. Pitch-Memorizer program. (Available on the March/April ReRUN disk.)

```
10 SCNCLR:COLOR0,1:COLOR4,1                    05          :REM*136
   :REM*71
20 CHAR,10,0,"{CTRL 9}{CTRL 5}
   {SHFT M}USICAL {SHFT P}ITCH
   {SHFT T}EST "+CHR$(14)
   :REM*84
30 CHAR,0,3,"{CTRL 0}{SHFT L}IS
   TEN TO THE FIRST PITCH AND M
   EMORIZE."          :REM*189
40 CHAR,10,14,"{SHFT R}ATING:{2
    SPACEs}{CTRL 2}{SHFT S}UPER
   IOR"               :REM*147
50 CHAR,19,15,"{COMD 7}{SHFT E}
   XCELLENT"          :REM*231
60 CHAR,19,16,"{COMD 6}{SHFT G}
   OOD"               :REM*201
70 CHAR,19,17,"{CTRL 8}{SHFT F}
   AIR"               :REM*215
80 CHAR,19,18,"{COMD 1}{SHFT B}
   ELOW AVERAGE"      :REM*231
90 CHAR,19,19,"{COMD 4}{SHFT D}
   ON'T SING IN PUBLIC":REM*139
100 TT=2:REM CHANGE TT TO LENGT
    HEN MEMORY TONE   :REM*139
110 R=INT(RND(1)*65000):SOUND1,
    R,60*TT:SLEEPTT   :REM*168
120 CHAR,0,3,"{CTRL 6}{2 SPACEs
    }{SHFT N}OW USE 1,2,4,5 KEY
    S TO TRY TO MATCH"  :REM*31
130 CHAR,4,4,"THE SOUND.{2 SPAC
    Es}{SHFT H}IT {SHFT R}ETURN
     WHEN DONE."       :REM*164
140 RR=INT(RND(1)*65000):IFABS(
    RR-R)<R*.2 THEN 140 :REM*26
150 DO:SOUND 1,RR,6    :REM*158
160 GET A$:IFA$="4"THENRR=RR*1.
    17                :REM*71
170 IFA$="1"THENRR=RR*.95
                       :REM*251
180 IFA$="5"THENRR=RR*1.005
                       :REM*91
190 IFA$="2"THENRR=RR*.995
                       :REM*223
200 IFRR<50 OR RR>65535 THEN RR
    =RO                :REM*103
210 RO=RR              :REM*188
220 LOOP UNTIL A$=CHR$(13)
                       :REM*47
230 :                  :REM*33
240 CHAR,5,10,"{COMD 8}{SHFT A}
    CTUAL":CHAR,25,10,"{SHFT Y}
    OUR"               :REM*21
250 CHAR,5,11,"{SHFT P}ITCH":CH
    AR,25,11,"{SHFT P}ITCH"
                       :REM*116
260 CHAR,4,12,STR$(INT(R)):CHAR
    ,24,12,STR$(INT(RR)):REM*57
270 IFR<RR THEN AV=R/RR:ELSE AV
    =RR/R              :REM*92
280 CH=INT(20*AV):CH=33-CH:IFCH
    >19THENCH=19       :REM*102
290 CHAR,18,CH,"{CTRL 4}{SHFT @
    }"                 :REM*139
300 CHAR,10,24,"{COMD 8}{SHFT D
    }O ANOTHER?{2 SPACEs}{SHFT
    Y}/{SHFT N}"       :REM*127
310 GETKEYA$:IFA$="Y"THENCHAR,1
    0,24,"{16 SPACEs}":CHAR,18,
    CH," ":CHAR,5,12,"{5 SPACEs
    }":CHAR,25,12,"{5 SPACEs}":
    GOTO110            :REM*25
320 PRINT"{HOME}":END  :REM*7 ■
```


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Gold Mine

Hints to survive the fiercest combat action, and 50 ways to toss your lover highlight this issue's Gold Mine gaming tips.

By LOUIS F. SANDER

Afterburner: Here are some places where you'll be safe from air-to-air missiles: in stage 2, the upper-left corner of the screen; in stage 3, the lower-right; in stage 5, the upper-left.

Sometimes another plane will come at you at the same time as an air-to-air missile. If you're good, you can weave your way between the missile and the plane.

—James Geis
Pittsburgh, PA

Arcade Games Construction Kit: Gift disks cannot be altered, but game disks can. So when making a gift disk, always classify it as a game disk until you have polished it up to the very end.

—Ardash Menon
Calgary, Alberta, Canada

Caveman Ugh-Lympics: When playing against the computer in the Clubbing event, put your athlete right below the end of the energy bar as soon as the event starts. Keeping the joystick up, start giving overhead smashes and pushing the fire button. Your opponent will be defeated in no time!

In the Mate Toss event, twirl your joystick rapidly counter-clockwise to pick up speed. If your player starts to bounce, hold the fire button down and release the joystick. Then pick up your mate and continue.

—Hector Alejandro Gutierrez Sanchez
Mexico City, Mexico

Die Hard: As you start the game, don't waste bullets on the two bad guys in the hall: use your bare hands. You'll need the ammo to eliminate the terrorist at the security panel.

In the final confrontation, Hans must be shot many times before he dies. Using an Uzi makes it easier.

—James Geis
Pittsburgh, PA

Double Dragon II: Find the box on the second level. When the enemy jumps down from the logs, throw the box onto the logs. He will pace without trying to attack you, so he's a sitting duck!

After killing him, jump on the logs and follow their bottom end. Two enemies will fall and die.

—James Canete
Vancouver, BC, Canada

Elite: When you're low on credits, as you are at the beginning of a game, you should trade in items that will bring you a high return per credit invested, such as food and textiles. When you have sufficient credits and are limited by cargo bay capacity, trade in items that will bring you a high return per ton of cargo, such as computers and furs.

Rear-firing lasers are a good investment for two reasons: You can target ships behind you without reversing course, and if your forward shields are damaged, you can turn around and fight, using your aft shields while the forward ones regenerate.

It takes a while to get used to the reversed controls, but once you learn it, you have a better chance in any fight. If you absolutely can't get used to the reversed controls, pause the game and use the "J" key to reverse the joystick channels.

—Peter J. Hradilek
Fortaleza, Brazil

Grand Prix Circuit: As long as you use the McLaren, the game is won at the starting line. When you get the green light, floor it and get in the inside lane. You should pass everyone, except for Nigel Levins, before the first turn. From there on it will be smooth sailing.

Nigel, who is never more than a half lap behind, waits until you slack off, then makes his move to pass. You never know exactly where he is because of the other cars, so always check your mirrors for his white car, especially in the last two laps.

—Anonymous

Knights of Legend: Here are some quests to get you started. Begin in Brettle, a city with four available quests. Say GAVEL to Stephanie Punderglass and retrieve the gavel from ruffians in the South Tantowyn Forest. Say KNIGHTS to Hegissa of Mistdwell and get a quill from ghouls in the Klvar Wood.

Say STANDARD to Stephen of Craymore and retrieve the standard from bandits on the Krell Way. Finally, say KAM to Mayor Figgley and get the Sword of Truth from goblins south of Brettle along the coast.

—Henning Vahlenkamp
Matawan, NJ

Maniac Mansion: To open the safe, go up to Edna's attic and open the painting. Then go to the observatory, use your dimes in the coin slot, and push the right button twice. Look through the telescope and you will see the safe's combination.

—Henning Vahlenkamp
Matawan, NJ

Nightmare on Elm Street: Instead of hitting your joystick button all the time, just press the spacebar for continuous firing of any weapon. You'll almost never get hit.

—Clay McNichols
Metropolis, IL

Revenge of Defender: The manual says that air buses don't appear in the Commodore version of this game, but I've found a way to get one. On the first level, leave one spaceship flying and land the Star Ray. If the spaceship lands on an installation, blow up the installation, but not the spaceship. The blue air bus will appear in 34 seconds. It will stay on your screen, so don't try to shoot it. Use your vaporizers, or if you don't have enough, hit it with the Star Ray.

—Ronald E. Feimster
Detroit, MI

Robocop: In the first level, keep moving and shooting until Murphy is past the last building. Then concentrate on ►

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the bad guy on the far right side, and on the crooks in the windows of the last building. Killing these characters over and over again seems to be the key to advancement to level two.

Although the game clues advise conserving ammunition, shoot as fast as you can. It won't diminish your energy level, and will actually help you advance more quickly.

—Jim Lawry
Brentwood, NY

Rocket Ranger: To finish this game you absolutely must rescue the girl and Doc, and find both lunarium bases and set up a resistance on them. If you don't do these things as quickly as possible, you will never finish the game or go to the moon.

—Lucy S. Terrier
Alton, IL

Secret of the Silver Blades: Here are the answers to *all* the riddles in the dungeon: The first level is YOUR HEART; the second is YOUR WORD; the third is YOUR BREATH; the fourth is RIVER; the fifth is WATER; the sixth is SILENCE; seventh is WIND; and the eighth and last is FIRE.

Vala is in the mines at level 6, and it is strongly recommended that you take her into your party when you find her.

These are all the TRUE paragraphs in the journal: 1–7, 12–13, 15–23, 25, 29–33, 35, 37–41, 43–45, 47, 49–58, 60, 62–71.

—Mark Sitjar
Address Unknown

Shinobi: Use the Q key to restart the same mission with fresh lives. Also, the gunslingers need to reload after three shots, not four. If you plug in two joysticks, a friend will be able to help you play the game. Use one joystick to control your ninja, and the other to execute those big jumps.

—David M. Jordan
Budingen, Germany

SimCity: To get an easy $4000 to build your city, make sure you have less than $4000 and push the F1 key. Your account will instantly grow to $4000. You can do this again and again whenever your account falls below $4000. If you do this too often, however, you will find that it takes all the challenge and fun out of building a city.

—Wendy Cheng
Plymouth, MN

Starflight: To get unlimited money, put some elements in your cargo hold. Endurium is the best, since it's worth the most money. Write-protect your disk, go to the Arth Starbase, and sell all but 0.1 cubic meter of Endurium. Then beam back up to your ship. You'll have the same amount of cargo as you had before you sold it! You can do this as many times as you like, unless the space station is destroyed by a solar flare.

Be sure to remove the write-protect tab on your disk before you buy anything with your ill-gotten money; otherwise you will lose the money without getting the goods.

I have explored this trick to the 9,999,000 M.U. level. If you want to explore even higher levels, I'd suggest you save your game first.

—Brian Smith
Omaha, NE

Tetris: Try these miscellaneous tips:

Disconnect your printer before booting the C-64 version.

Avoid leaving deep holes one brick wide and two deep: they are very hard to fill.

S pieces are troublesome, but they stack neatly. I like to dump them on the sides of the screen, left-handed pieces on one side, right-handed on the other.

Placing I pieces vertically in the center of the screen is dangerous. If there's no convenient place to put an I piece, it's a good idea to dump it on the left or right side of the screen.

T pieces are very useful for filling unusual holes. Use them wisely.

Once you've created about 80 rows, you'll need almost the entire screen in order to rotate and place a piece without making a mistake. Be careful!—if the pit fills more than halfway, you're in big trouble.

—Bruce D. Rose
Manhattan Beach, CA

Turbo Out Run: Save your turbos for long straightaways. If you use them on sharp turns, you'll slide off the side of the road and spin out, or you'll be forced to slow down.

Turbos are also useful immediately after a crash. They will accelerate your car much faster, and you'll be up to full speed in a flash.

—James Geis
Pittsburgh, PA

Ultima V: The Magic Carpet is in Lord British's bedroom, which is on the roof. The only way you can get into the room is to use a skull key. Search all trees, barrels and chests.

To get into a dungeon, yell a word of power. Here are the necessary words for the various dungeons: Deceit—FALLAX, Despise—VILLIS, Shame—INFAMA, Wrong—MALUM, Hythloth—IGNAVUS, Covetous—AVIDUS, Destert—INOPIA and Abass—UNDER CODEX.

—Jason Hoffman
Woodridge, IL

War in Middle Earth: You have to be very organized to win this game. When you begin, collect your armies into two or three large groups. If you do this, you can make sure that you always have a larger fighting force than your enemy.

When fighting the Nazgul, you should try to keep four warriors on each enemy all the time. This will greatly enhance your chances of winning.

Write down the locations of the Palantir. They are always in the same places, so you can collect them at the beginning of every game.

—Sheridan Hortness
CFB Borden, Ontario, Canada

Zak McKracken: You can make $1,500 by selling the bent butter knife to the store. Go to Zak's bedroom and pick up the bottom-right corner of the rug. To bend the butter knife, tell him to use it with the floorboards.

Teleporting to Mars is worthwhile, but takes many steps. You need a space suit, however the wet suit will do just fine. Also, you need an oxygen tank, which you can find on the plane. Then find the two yellow shards and fuse them together at Stonehenge. Once you've done all this, get trained by the Grue and you're ready for teleportation.

—Jeff Annetts
Morrisville, VT ■

To submit your own C-64 or C-128 game tips for consideration, send them to The Gold Mine, PO Box 101011, Pittsburgh, PA 15237. Please use 8½ by 11-inch paper, and put your name, complete address and Social Security number on each sheet you send.

Be sure to state which Commodore computer and program your tip is for. Neatness and clarity count. RUN pays $5 for each submission that is accepted.

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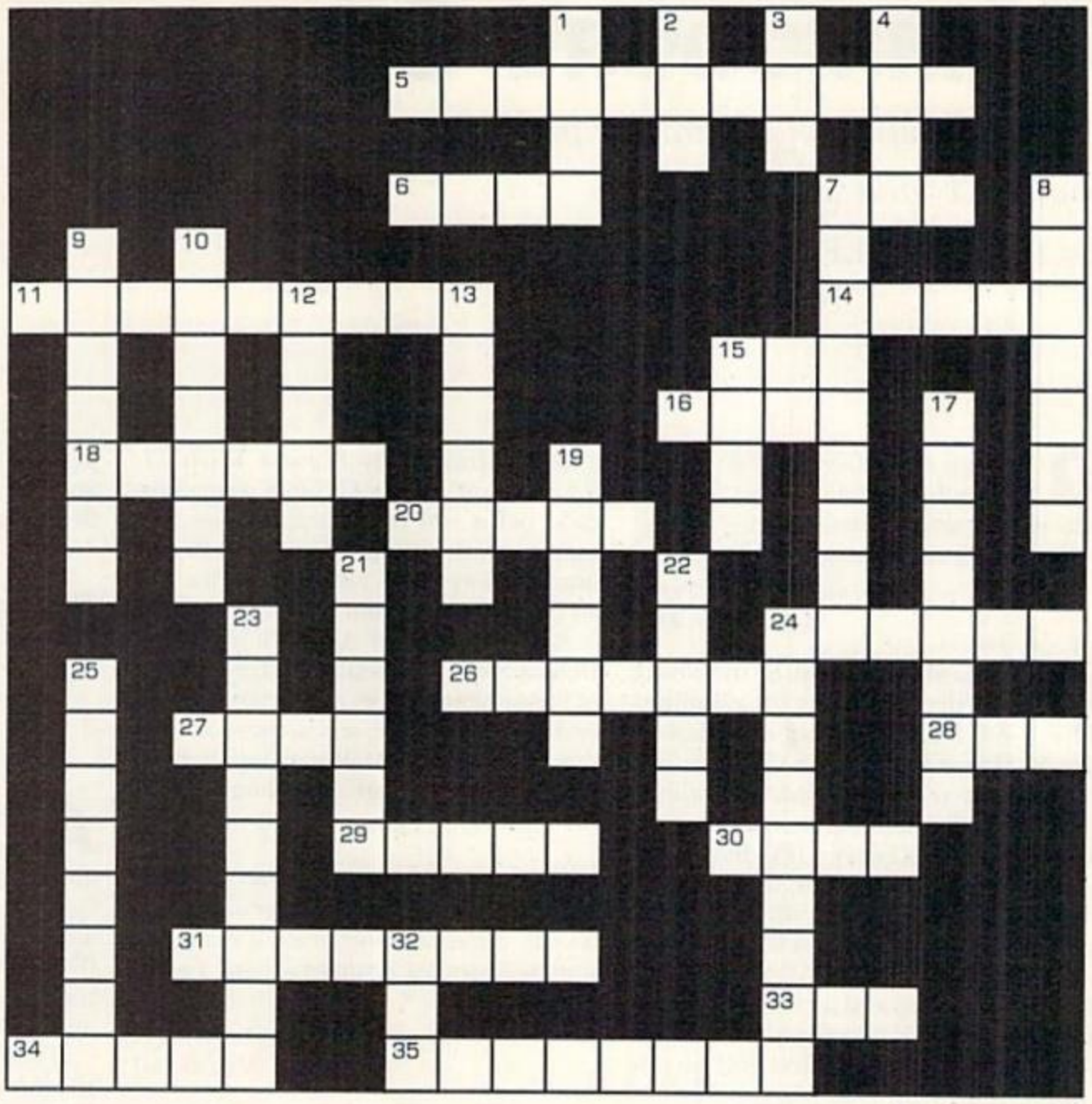

See answers p. 23.

DOWN

1. Command to put a program on a disk.
2. This removes a program from memory.
3. The smallest unit of computer information.
4. Information contained in a program or input by the user.
7. To add an element of chance to a program.
8. Numeric data.
9. The semiconducting element used to make computer chips.
10. Any set of instructions run by a computer.
12. A programming language used for accounting and business applications.
13. A procedural multipurpose programming language.
15. Use this to make the computer show you the program in memory.
17. The input device used to put numbers and letters on the screen.
19. Base two numbers.
21. A type of file that permits any record to be retrieved in any order.
22. An erasable, programmable microchip.
23. One method of planning the sequence of routines to be used in a program.
24. Shortened codes used for computer instructions.
25. An input device used to draw on the monitor.
32. A program flaw that makes it malfunction.

ACROSS

5. Base sixteen numbering system, used to simplify binary numbers.
6. Eight bits.
7. Programmable memory.
11. Many of these make up a motherboard.
14. Refers to non-technical data, like a thermometer or barometer.
16. Garbage in, garbage out.
18. The small flashing square that moves about the screen.
20. Another name for Beginner's All-purpose Symbolic Instruction Code.
24. This is stored on chips.
26. A scientific computer programming language (Formula Translation).
27. Use this command to put a program on a disk into the computer's memory.
28. Command to execute a program. (Or the name of your favorite magazine.)
29. Device used to link computers via telephone.
30. A computer language often used to teach geometry to children.
31. A program used to store information and the files it generates.
33. This contains the control unit and the arithmetic logic unit.
34. Information entered into the computer.
35. Computerized drawings on the screen or on paper.

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COMMODORE CLINIC

Troubleshooting your hardware problems, maximizing your REU and writing a will.

By ELLEN RULE

Q *The keys of my C-64 must be tapped vigorously to operate. I think the contacts must be dirty. Is there a way of getting to the contacts and cleaning them?*

—MITCHELL PENN
BALTIMORE, MD

A The keyboard must be removed from the computer for cleaning. The *C-64 Troubleshooting and Repair Guide* (Howard W. Sams & Co.) gives directions for removing and reinstalling the keyboard. This book is available from Tenex Computer Express (PO Box 6578, South Bend, IN 46660; 1-800/776-6781). An alcohol-, not silicone-based cleaner should be used on the contacts.

Only attempt this job if you're proficient at soldering and aware of the anti-static precautions! The thirty-odd dollars you might pay a qualified technician could well be worth the job, considering the disassembly, desoldering, cleaning, reassembling and testing you will go through to solve your problem.

Q *I recently purchased a 1764 REU for my C-64. It is very useful with GEOS, Maverick and Super Snapshot, but I am disappointed that most programs I use won't support the REU and sometimes the programs crash. My main interest is graphics. The Globe and Pound demos on the demo disk are great, but the manual has poor documentation. It doesn't explain how to animate your own images. Is it possible for me to use the 1764 to animate GeoPaint pics?*

—PETE EMORY
BLOOMFIELD, NJ

A To relieve your REU woes, Creative Micro Designs, Inc., (50 Industrial Drive, PO Box 646, East Longmeadow, MA 01028; 413/525-0023) now offers a product called RAMLink (see their ad on pages 2–3 in this issue for prices), which allows most commercial software to access the 1700, 1764 and 1750 REUs as RAM disks. This hardware interface plugs into the cartridge port and provides improved speed and a power back-up to preserve REU data when you shut your computer off.

GeoAnimator by Francis Kostella, available on *RUN*'s GEOS Companion disk, helps you create stand-alone animations with music. There is a 40-column version for 64 and 128 modes and an 80-column version for GEOS 128.

Also available are AlbumAnimator by Dennis Sietz, which allows page-flipping of Photo Album pages at different speeds, and Ultimate Stage, a shareware animation program by R.M. Pringleton, Jr. Both are for the 64 and are posted on Q-Link.

Q *The entire circuit board of my C-64 was replaced and it worked for about 6–8 months. But now the cursor starts moving as soon as I turn the computer on and I can't type anything.*

—BARBARA LONERGAN
VILLAS, NJ

A First, try wiggling or unplugging your joystick and see if the problem still occurs. A joystick can send a signal to the 64's CIA chip that interferes with the keyboard signal. It's also possible that your space bar key is stuck or the CIA chip is malfunctioning. Your Commodore-authorized repair person should be able to diagnose and fix your problem.

Q *My C-128 won't go into 64 mode. I have tried GO64, inserting cartridges into the game port and loading autobooting disks. All attempts lock up the computer. The computer works perfectly in 128 mode. I replaced the PLA chip and the Kernal, with no effect. I realize the MMU is a possibility, but I hesitate to continue replacing chips at random. Could you direct me toward a solution?*

—GEORGE MITCHELL
BURLINGTON, IA

A I think you have discovered the problem of replacing chips when you are not sure where the cause of your difficulty lies. Each time you handle a chip or apply a soldering iron to your motherboard you risk damaging the chip, the board, or both.

Your next step should be to take your 128 to a Commodore-authorized repair person, who has had extensive training and can use specific diagnostic tools to determine the source of the problem.

Q *I can't find an edge-board connector that will go into my C-64 user port. I'm hooking it up to an interface.*

Can you help me?

—TIM ECK
GERMANTOWN, WI

A A 24-pin edge connector for the 64 user port is available for a reasonable price from Jason-Ranheim (3105 Gayle Lane, Auburn, CA 95603; 1-800/421-7731. For Tech Support: 916/878-0785) They also carry cartridge port materials such as an EPROM programmer and RAM/ROM cartridge supplies.

If you're interested in other electronic projects for your 64/128, VIC-20 or Plus/4, look for *Practical Interfacing Projects with the Commodore Computers* by Robert Luetzow, published by TAB Books.

Q *I own a C-128 and 1802 monitor. When I bought my system (used) I also got an RGB-to-RGB cable and two regular one-to-three 40-column color cables. Now I'm trying to get 80-column monochrome by making the RGB-to-RGB into an RGB 3-prong.*

—ROBERT TIMMONS
NORTH BERGEN, NJ

A I know of no way to convert the 128's 80-column color signal to a composite signal. You need only to tap off pin 7 of the RGB connector to get a monochrome 80-column signal, which is actually constructed by circuitry within the 128 from the R, G, B and I (digital) signals.

You can, however, buy the cable from many of the suppliers who advertise in *RUN*. Tenex Computer Express (PO Box 6578, South Bend, IN 46660; 1-800/776-6781) has a switchable cable which plugs into both video ports on the 128. Although a bit more expensive than a simple monochrome cable, this device saves plugging and unplugging to swap be-

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tween 40-column color, 40-column monochrome and 80-column monochrome modes.

Q *Currently I am using three printers with my 64, but I am running only two printer interfaces using serial device numbers 4 and 5. I must turn off my 64 to plug and unplug printers into an interface to change printers. I have learned that the original architecture was designed for printers to use serial device numbers 4, 5, 6 or 7. Could you provide me with either a manufacturer who can supply an interface for serial device number 6 or 7, or provide some information which I could use to make such a device?*

—George Aiken
Orlando, FL

A Most software available for the 64 and 128 won't allow you to address devices 6 or 7. The use of such device numbers would be restricted to custom applications. I would therefore recommend an ABC switch box instead.

If all three printers have a Centronics parallel interface, you can use a parallel-to-parallel switch with one interface coming from your 64, and parallel cables from the switch box to the printers. I'm afraid this won't be much cheaper than purchasing another interface, but it will save wear and tear on the printers, the interface and you! Remember, to avoid damage to the components, it's safest to shut down your system before moving the switch from one printer to another.

Q *I inadvertently copied two data files to my GeoCalc master disk. Is there any way to remove these files? When I try to delete them or put them in the trashcan, GEOS responds with "This Operation Cannot Be Performed On a Master Disk."*

—Robert James, Jr.
Haltom City, TX

A A simple solution would be to move the files to the back page of your desktop and forget they're there. If the files are really in your way, a program called Erase Header by Alex Burger will alter the Master Disk status on 1541/71/81 disks. You should be able to find this posted on Q-Link. In the future, keep your master disks write-protected!

Q *I have recently been looking for a C-64 program that will allow me to write a will. At one time I used to see such programs for sale, but now I don't.*

—Dave Burkett
Caro, MI

A Tenex (1-800/776-6781) carries a program called DiskWill, which assists non-lawyers in preparing a will. ■

Do you have a problem or question about your Commodore computer system, software or programming? Send a letter to Commodore Clinic, RUN *Magazine, 80 Elm St., Peterborough, NH 03458. Questions are answered only in this column and are those likely to appeal to a large number of our readers.*

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SMART SHOPPER

Continued from page 36.

```
    "NO"THEN113Ø          :REM*5Ø
12ØØ FORX=1TO5:ZZ=Ø       :REM*22Ø
121Ø PRINT"{CRSR DN}";SN$(X):IN
    PUT"AISLE NUMBER ";ZZ
                          :REM*9
122Ø IFZZ<ØORZZ>99THENPRINT"OUT
     OF RANGE":GOTO121Ø:REM*88
123Ø IN(NG+1,X)=ZZ:NEXTX
                          :REM*2Ø9
124Ø GOSUB9Ø:GOTO113Ø     :REM*2Ø6
125Ø PRINT"{SHFT CLR}{2 CRSR DN
    s}STORE NAMES":NN$=""
                          :REM*131
126Ø PRINT"ENTER STORE NUMBER T
    O CHANGE"             :REM*28
127Ø GOSUB 58Ø            :REM*82
128Ø INPUT"NEW STORE NAME-->";N
    N$                    :REM*115
129Ø PRINT"{SHFT CLR}{2 CRSR DN
    s}NEW STORE NAME=>";NN$
                          :REM*213
13ØØ PRINT"TYPE N FOR NO OR RET
    URN FOR YES";:ZZ$=""
                          :REM*22
131Ø INPUTZZ$:IFZZ$="N" OR ZZ$=
    "NO"THEN125Ø          :REM*118
132Ø SN$(ZZ)=LEFT$(NN$,15)
                          :REM*64
133Ø GOTO98Ø              :REM*146
134Ø PRINT"{SHFT CLR}{2 CRSR DN
    s}{15 SPACEs}EDIT ITEMS"
                          :REM*82
135Ø PRINT"ITEM NUMBER TO EDIT
                          :REM*121
136Ø PRINT"(NUMBER FROM ITEM LI
    STING)";              :REM*72
137Ø INPUT"->";IX$:IFIX$="R"THE
    N1Ø5Ø                 :REM*1Ø2
138Ø IX=VAL(IX$):IFIX<1ORIX>NGT
    HEN134Ø               :REM*22Ø
139Ø GOSUB2Ø9Ø            :REM*2Ø3
14ØØ PRINT"{2 CRSR DNs}CHANGE I
    TEM SPELLING--->1":REM*133
141Ø PRINT"CHANGE AISLE NUMBER-
    --->2"                :REM*2Ø
142Ø PRINT"ITEM OK NEXT ITEM---
    --->3"                :REM*49
143Ø PRINT"RETURN TO ITEM MENU-
    --->4"                :REM*1Ø3
144Ø PRINT"RETURN TO EDIT MENU-
    --->5"                :REM*219
145Ø PRINT"RETURN TO MAIN MENU-
    --->6":HS=6:GOSUB198Ø
                          :REM*23
146Ø ONZZGOTO147Ø,158Ø,156Ø,134
    Ø,98Ø,1Ø5Ø            :REM*245
147Ø PRINT"{SHFT CLR}{4 CRSR DN
    s}{CTRL 1}ITEM-->{CTRL 2}"
    ;M$(KF(IX,1))         :REM*247
148Ø PRINT"{CRSR DN}CORRECT SPE
    LLING AND HIT RETURN":IQ=Ø
                          :REM*54
149Ø PRINT"{2 CRSR DNs}ITEM-->"
    ;M$(KF(IX,1))         :REM*95
15ØØ INPUT"{CRSR UP}{5 CRSR RTs
    }";Z$                 :REM*216
151Ø Z$=LEFT$(Z$,15):PRINT"ITEM
    -->";Z$               :REM*223
152Ø PRINT"TYPE N FOR NO OR RET
    URN FOR YES";         :REM*76
153Ø ZZ$="":INPUTZZ$:IFZZ$="N"
    OR ZZ$="NO"THEN147Ø
                          :REM*14Ø
154Ø TK=KF(IX,1):FORM=IXTONG-1:
    KF(M,1)=KF((M+1),1):NEXTM
                          :REM*62
155Ø NG=NG-1:CS=1:GOSUB1ØØ:GOTO
    98Ø                   :REM*32
156Ø IX=IX+1:IFIX>NG THENIX=1
                          :REM*116
157Ø GOTO139Ø             :REM*115
158Ø GOSUB2Ø9Ø:PRINT"{2 CRSR DN
    s}SELECT STORE TO CHANGE":
    GOSUB58Ø              :REM*17Ø
159Ø PRINT"{SHFT CLR}{2 CRSR DN
    s}STORE-->";SN$(ZZ)
                          :REM*188
16ØØ PRINT"{2 CRSR DNs}ITEM-->"
    ;M$(KF(IX,1))         :REM*2Ø5
161Ø PRINT"{2 CRSR DNs}PRESENT
    AISLE NUMBER ";IN(KF(IX,1)
    ,ZZ):GOSUB8Ø          :REM*232
162Ø INPUT"NEW AISLE NUMBER";IN
    (KF(IX,1),ZZ)         :REM*55
163Ø GOSUB2Ø9Ø:GOSUB8Ø:PRINT"{C
    RSR DN}TYPE N FOR NO OR RE
    TURN FOR YES";        :REM*44
164Ø ZZ$="":INPUTZZ$:IFZZ$="N"
    OR ZZ$="NO"THEN159Ø
                          :REM*195
165Ø GOTO139Ø             :REM*195
166Ø PRINT"{SHFT CLR}{CRSR DN}
    {CRSR DN} {CRSR DN} {CRSR
    DN} {CRSR DN} SET UP PRINT
    ER AND HIT ANY KEY":REM*18
167Ø PRINT"{15 SPACEs}WHEN READ
    Y"                    :REM*9
168Ø GETK$:IFK$=""THEN168Ø
                          :REM*149
169Ø OPEN3,4:PRINT#3,"{2 SPACEs
    }#{5 SPACEs}ITEM";:REM*178
17ØØ PRINT#3,CHR$(16)"2Ø";SN$(1
    );                    :REM*238
171Ø PRINT#3,CHR$(16)"45";SN$(3
    );                    :REM*1Ø2
172Ø PRINT#3,CHR$(16)"65";SN$(5
    )                     :REM*213
173Ø PRINT#3,CHR$(16)"35";SN$(2
    );                    :REM*126
174Ø PRINT#3,CHR$(16)"55";SN$(4
    )                     :REM*221
175Ø PRINT#3,:FORX=1TONG:REM*56
176Ø Z$=LEFT$((STR$(X)+SP$),4)+
    LEFT$((M$(KF(X,1))+LN$),22
    )                     :RLM*3Ø
177Ø FORQ=1TO4:Z$=Z$+LEFT$((STR
    $(IN(KF(X,1),Q))+LN$),1Ø):
    NEXTQ                 :REM*92
178Ø Z$=Z$+STR$(IN(KF(X,1),Q))
                          :REM*56
179Ø PRINT#3,Z$           :REM*15Ø
18ØØ NEXTX:CLOSE3:GOTO98Ø
                          :REM*53
181Ø PRINT"{SHFT CLR}{3 CRSR DN
    s}{13 SPACEs}NEW DISK SETU
    P "                   :REM*41
182Ø PRINT"{3 SPACEs}INSERT FOR
    MATTED DISK IN DRIVE AND"
                          :REM*13
183Ø PRINT"{11 SPACEs}RETURN WH
    EN READY"             :REM*21
184Ø PRINT"{3 CRSR DNs}{4 SPACE
    s}OR TYPE ANY KEY AND CR T
    O RETURN";            :REM*239
185Ø PRINT"{15 SPACEs}TO THE MA
    IN MENU";             :REM*156
186Ø Z$="":INPUTZ$:IFZ$<>""THEN
     68Ø                  :REM*118
187Ø Z$="":PRINT"{3 CRSR DNs}CR
    EATING USER FILE..SHOPDATA
    "                     :REM*22
188Ø OPEN15,8,15:OPEN1,8,8,"Ø:S
    HOPDATA,S,W"          :REM*133
189Ø FORX=1TO5:PRINT#1,"STORE "
    ;X:NEXTX              :REM*23
19ØØ PRINT#1,1:PRINT#1,1:CLOSE1
    :CLOSE15              :REM*17
191Ø PRINT"{3 CRSR DNs}CREATING
     USER FILE..GROCERY"
                          :REM*215
192Ø OPEN15,8,15:OPEN1,8,8,"Ø:G
    ROCERY,S,W"           :REM*173
193Ø PRINT#1,1:PRINT#1,"MILK"
                          :REM*23Ø
194Ø PRINT#1,1            :REM*223
195Ø CLOSE1:CLOSE15       :REM*15
196Ø GOTO6ØØ              :REM*228
197Ø PRINT"{SHFT CLR}":END
                          :REM*252
198Ø PRINT"{2 CRSR DNs}SELECTIO
    N-->{CTRL 9}{2 SPACEs}{CTR
    L Ø}"                 :REM*2Ø3
199Ø IFZZ<Ø3THENX=2:GOTO2Ø2Ø
                          :REM*184
2ØØØ IFZZ<Ø6THENX=1       :REM*132
2Ø1Ø IFZZ>Ø6THENZZ=Ø       :REM*14Ø
2Ø2Ø ONXGOTO2Ø3Ø,2Ø4Ø      :REM*96
2Ø3Ø PRINT"{CTRL 1}{CRSR UP}SEL
    ECTION-->":GOTO2Ø5Ø
                          :REM*15Ø
2Ø4Ø PRINT"{CTRL 2}{CRSR UP}SEL
    ECTION-->"            :REM*98
2Ø5Ø ZZ=ZZ+1:GETK$:IFK$=""THEN1
    99Ø                   :REM*4Ø
2Ø6Ø IFVAL(K$)<1ORVAL(K$)>HSTHE
    NK$="":GOTO2Ø3Ø       :REM*138
2Ø7Ø ZZ=VAL(K$):PRINT"{CTRL 2}{
    CRSR UP}SELECTION-->{CTRL
    9}";ZZ                :REM*89
2Ø8Ø GOSUB8Ø:RETURN        :REM*86
2Ø9Ø PRINT"{SHFT CLR}{4 CRSR DN
    s}{CTRL 1}ITEM-->{CTRL 2}"
    ;M$(KF(IX,1))         :REM*1Ø2
21ØØ PRINTTAB(22)"{CRSR UP}{CTR
    L 1}ITEM NUMBER-->{CTRL 2}
    ";IX                  :REM*232
211Ø PRINT"{2 CRSR DNs}{CTRL 1}
    AISLE{5 SPACEs}STORE NAME{
    7 SPACEs}STORE NUMBER{CTRL
     2}"                  :REM*2Ø7
212Ø FORZ=1TO5:PRINTIN(KF(IX,1)
    ,Z);                  :REM*221
213Ø PRINTTAB(1Ø);SN$(Z);
                          :REM*27
214Ø PRINTTAB(31);Z:NEXTZ:RETUR
    N                     :REM*1Ø6
```

■

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RUN's Checksum & Program Typing Hints

TYPE IN *RUN*'S CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running it. When typing in a program from *RUN*, first load and run *RUN*'s latest version of the Checksum program, which contains a new feature explained below. The screen will display a SYS number (49152 for the C-64; 3328 for the C-128) that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

When you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line as you typed it is correct. If the number that appears doesn't match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the appropriate SYS number, and save the finished program.

We sometimes get letters and phone calls from new readers who have typed in the Checksum program for the first time. They are confused by the "Out of Data Error in Line 30" message that appears when they try to run the Checksum program. Understandably, they compare line 30 of the listing with line 30 as they typed it in, and cannot find anything wrong. The message unintentionally misleads them into thinking the error is in line 30, whereas the typing mistake is actually somewhere in one of the Data statements in lines 190–350.

So, we've added a new feature to the Checksum program that alerts readers to the number of the Data statement line in the Checksum program where an error has actually been made. **Note that this feature works *only* on the Checksum program itself, and not on any other program listing in *RUN*.**

After you've entered and saved the Checksum program to disk, run it. If you've made any errors in any of the Data statements, the program will give you a specific line number. Find the mistake, correct it, press return, save the program and run it again. Repeat this procedure until the Checksum program runs flawlessly.

Control Characters Demystified

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key once. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACES}—press the space bar 22 times.

{SHIFT CLR}—hold down the shift key and press the clr-home key once.

{2 CRSR DNs}—press the cursor-down key twice.

{CTRL 1}—hold down the control key and press the 1 key.

{COMD T}—hold down the Commodore logo key and press the T key.

{5 LB.s}—press the British pound key (£, *not* #) five times.

Refer to the following paragraphs for any other Error messages you get from running any program listing in *RUN*.

Other Error Messages

Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these.

- You get an "Out of Data in Line xxx" message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the program line that reads the data, usually a For-Next loop. Make sure you have the proper values for the loop, because if, for example, the listing has a loop of 0 to 150, and you've typed 0 to 160, you'll get the Out of Data message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. It's more likely that you've skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing. Using *RUN*'s Checksum program when you type in listings from the magazine should help in this case.

- You get an "Illegal Quantity Error in Line xxx" message. This means you've read a number from a Data statement and tried to poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. First look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a "Syntax Error in Line xxx" message. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an "Error in Data" message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully. Correct the mistake(s), save the new version and try again.
- Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which will help you avoid every mistake we've mentioned above, except that it won't detect the omission of a line. R

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(4096)THEN MO=64:SA=49152
30 I=0:CK=0:CH=0:LN=190
40 FOR K=0 TO 16
50 FOR J=1 TO 10:READ B:IF B>255 THEN GOTO 170
60 CH=CH+B:POKE SA+I,B:I=I+1:NEXT
70 READ LC
80 IF LC<>CH THEN GOTO 170
90 CH=0:LN=LN+10
100 NEXT K
110 POKESA+110,240:POKESA+111,38:POKESA+140,234
120 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
130 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128 THEN 1
    60
140 POKESA+13,124:POKESA+15,165:POKESA+25,124:POKESA+2
    6,165
150 POKESA+39,20:POKESA+41,21:POKESA+123,205:POKESA+12
    4,189
160 POKESA+4,INT(SA/256):SYS SA:NEW
170 PRINT"YOU HAVE A DATA ERROR IN LINE ";LN;"!":END
180 REM DO NOT CHANGE THESE DATA STATEMENTS!
190 DATA 120,162,24,160,13,173,4,3,201,24,884
200 DATA 208,4,162,13,160,67,142,4,3,140,903
210 DATA 5,3,88,96,32,13,67,152,72,169,697
220 DATA 0,141,0,255,133,176,133,180,166,22,1206
230 DATA 164,23,134,167,132,168,170,189,0,2,1149
240 DATA 240,58,201,48,144,7,201,58,176,3,1136
250 DATA 232,208,240,189,0,2,240,42,201,32,1386
260 DATA 208,4,164,180,240,31,201,34,208,6,1276
270 DATA 165,180,73,1,133,180,230,176,164,176,1478
280 DATA 165,167,24,125,0,2,133,167,165,168,1116
290 DATA 105,0,133,168,136,208,239,232,208,209,1638
300 DATA 169,42,32,210,255,165,167,69,168,170,1447
310 DATA 169,0,32,50,142,169,32,32,210,255,1091
320 DATA 32,210,255,169,13,32,210,255,104,168,1448
330 DATA 96,104,170,24,32,240,255,104,168,96,1289
340 DATA 56,32,240,255,138,72,152,72,24,162,1203
350 DATA 0,160,0,32,240,255,169,42,208,198,1304
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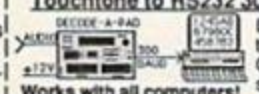

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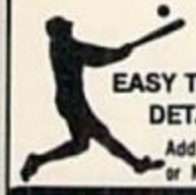

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New Hardware—
What's it like to use your C-64 with its operating speed quadrupled and its disk access time cut to one fifth? Find out next issue as we review the Turbo Master accelerator cartridge. Also, discover what new features are available on the latest version of the Super Snapshot utility cartridge.

Video Booster—
One way you can improve your C-128 is with a 64K video RAM upgrade. Find out the benefits, how to get your system modified and what software will take advantage of this upgrade.

CES Report—
The Winter Consumer Electronics Show is traditionally a hotbed of activity for electronics consumers and computerists. You'll get a glimpse of the new products ready to hit the market.

ReRUN Preview—
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Lyco Computer

Marketing & Consultants

Since 1981

IBM Business Partner

star MICRONICS — NX-2410

- 180 cps draft
- 60 cps Letter Quality
- 24 Pin printer
- Friction & Push tractor feed
- 2-year limited warranty

$229.95

ACCESSORIES

Diskettes:	
5¼ Disk Notcher	$5.95
Xidex 5¼ DSDD	$4.95
Xidex 3½ DSDD	$9.95
Surge Protectors:	
QVS PP-102	$15.95
QVS PP-112	$15.95
QVS PP-104	$23.95
Printer Interfaces:	
Xetec Jr.	$38.95
Xetec Supergraphics	$55.95
Xetec Gold	$74.95
Printer Paper:	
1000 sheet laser	$16.95
Banner Paper 45' Roll	$10.95
Drive Maintenance:	
5¼ Drive Cleaner	$4.95
3½ Drive Cleaner	$4.95

brother — M1324L

- 270 cps draft 15cpi
- 90 Letter Quality 15cpi
- 24-Pin printer
- 1-year Warranty

$245.95

star MICRONICS

- 180 cps draft 12cpi
- 45 cps NLQ 12cpi
- 4 resident fonts
- Front Control Panel

2-year limited warranty

NX-1001 $139.95

PRINTERS

Panasonic

1180	$144.95
1191	$218.95
1124	$269.95*
1695	$409.95
1624	$349.95*
1123	$CALL

*Quantities Limited.

CITIZEN

- 120 cps draft speed with improved throughput capabilities
- Built-in variable-width tractor
- compact design w bottom paper feed minimize space requiremnts

120 D $134.95

Star

NX-1001	$139.95
NX-2420	$279.95
NX-1020 Color	$179.95
NX-2410	$229.95

Epson

LX-810	$184.95
LQ-510	$279.95
FX-850	$309.95*
FX-1050	$429.95
LQ-850	$469.95

Panasonic Office Automation

- 9-Pin personal printer
- EZ-Set operator panel
- adjustable push pull tractor feed
- multiple paper paths
- 192 cps draft
- 38 cps NLQ

KX-P1180 $144.95

Citizen

120 D	$134.95
200GX	$168.95
HSP-500	$319.95
GSX-140	$289.95

Brother

M1809	$309.95
1824L	$399.95
M1909	$419.95
M1324L	$245.95
M1309	$155.95

Okidata

172	$185.95
182 Turbo	$222.95
320	$325.95
321	$455.95

Printer ribbons, cables, connections and accessories available for all applications. Please Call.

COMMODORE UPGRADES

MAGNAVOX — 1CM135

- Analog RGB input
- Easy access front controls
- Built-in tilt stand
- 640 H x 200 V

$244.95

GoldStar — 2105 A

- 12" Amber display
- 640 Hx200 V
- IBM and Commodore compatible

$79.95

MONITORS

Magnavox:	
CM8702 Color Comp	$CALL
1CM135 RGB Analog	$244.95
GoldStar	
2105 A Composite	$79.95

MODEMS

Cardinal:	
MB2400EX EXT 2400 Baud	$94.95
MB1200EX EXT 1200 Baud	$79.95
Everex:	
Evercom 12 (INT)	$49.95
Evercom 24 (INT)	$109.95
Evercom 24 + (INT) MNP level 5	$149.95
Evercom 24E + MNP level 5	$199.95

HARDWARE

64C Computer	$CALL
C 128 D Computer Drive	$CALL
1541 II Disk Drive	$CALL
Colt PC	$CALL
1670 Modem	$CALL

GEOS 64 2.0

GEOS is the operating system that works your hardware harder than its ever worked before. Loading, processing, accessing information all at the mere touch of a mouse or joystick.

$35.95

Cardinal

- Low error data transmission and reception over standard dial-up telephone lines
- hayes compatible with the universally-accepted AT command set
- Automatic Data Standard and Speed Adjust features

MB2400EX External Modem

$94.95

Why shop at Lyco Computer? Lyco Computer offers quality name brand computer products at prices 30% to 50% below retail. If you do not see the product you want advertised, call Lyco Marketing toll free. *How do I know I will get the product I need?* Our marketing staff receives continous formal training by our manufacturers. Though our strict guarantee on providing only new merchandise prohibits free trial periods and a guarantee on compatibility, a wealth of knowledge is available to our customers.As thousands of people every week capitalize on our savings and services, we hope you too, will make Lyco Computer your first choice. *What about warranty or service?* Our Customer Service Department is available at (717) 494-1670 to assist you. We back all of our manufacturer's stated warranty terms. Before returning any item that appears to be defective, we ask that you call our Customer Service Department. *Will you rush an item to me?* We offer next day air, two day air, standard UPS, and postal international shipping services. Temporary shortages are normally filled within 10 days. *How do I order?* We have always accepted C.O.D. orders through UPS. Prepaid cash orders over $50 are shipped freight-free. For orders under $50, please add $3 for freight. Personal and company checks require a 4 week clearing period. Visa, Master Card, American Express and Discover Card orders are accepted for your convenience. Purchase orders are accepted from Educational Institutions. We charge sales tax on deliveries in Pennsylvania. For APO, FPO, and international orders, add $5 plus 3% for priority mail. Advertised prices and availability are subject to change. Simply send your order to Lyco Computer, P.O. Box 5088, Jersey Shore, PA, 17740. Or, call 1-800-233-8760 or (717) 494-1030. Return restictions apply. Not responsible for typographical errors.

Sales: 1-800-233-8760 or 717-494-1030
Fax:717-494-1441
Hours: Mon.-Fri. 9a.m.-9p.m.
Sat. 10a.m.-6p.m.
Customer Service: 717-494-1670
Hours: Mon.-Fri. 9a.m.-5p.m.

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Our friendly sales staff can help you with any questions you have!

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Price Guarantee

Since 1981 we have led the industry by continuing to offer the lowest national prices while providing quality service. Many companies have come and gone trying to imitate our quality and service. If by some oversight we do not have the lowest prices advertised on the products you desire, then we would appreciate the opportunity to rectify the oversight.

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